GAMBLING AND PROBLEM GAMBLING IN THE COMMUNITY: AN INTERNATIONAL OVERVIEW AND CRITIQUE

Report Number One of the New Zealand Gaming Survey

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Chief Executive's Foreword

It gives me great pleasure to release the first in a series of reports from the New Zealand Gaming Survey, *Gambling and Problem Gambling in the Community: An International Overview and Critique*.

The report provides a critical review of local and international research relating to:

- community participation in, and attitudes to, different types of gambling; and
- problem and pathological gambling.

The report discusses and critiques the principal findings of this large body of research. It also considers the methodological strengths and weaknesses of the many studies in the area. The report will be a valuable source of information on the published and unpublished literature relating to gambling and problem gambling, and I would like to thank Professor Max Abbott and Dr Rachel Volberg for their work in producing it.

The full suite of reports from the New Zealand Survey will also comprise:

- Results of a two-phase national problem gambling prevalence study:
  - ◊ Phase 1 is a key component of the whole study. It involved contacting 6000 New Zealanders by telephone and asking them about their gambling habits.
  - ◊ Phase 2 builds on stage 1. It involved in-depth, face-to-face interviews with at least 500 persons who participated in stage 1.
- Results from fresh interviews with people who participated in Phase 2 of a previous national survey in 1991/92.
- A survey of the gambling behaviour of recently incarcerated prisoners.
- A synthesis of all aspects of the research project.

I am confident that the reports from the New Zealand Gaming Survey will shed new light on the gambling behaviour of New Zealanders, and in particular, will provide robust information on the impact of the growth in gambling opportunities since the last national survey was conducted in 1991/1992. I am also sure that the reports will provide a fertile source of debate for many years to come. That debate, provided it is constructive, can only serve to advance our knowledge in this important area of social and economic policy.

Roger Blakeley
Chief Executive
Department of Internal Affairs

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1. INTRODUCTION

1.1 Scope, Purpose and Background

The scope of this literature review is shaped by its primary purpose, namely, to inform all facets of the 1998-1999 New Zealand Gaming Survey (NZGS). This research programme includes the following elements:

- Literature Review
- Consultation
- National Prevalence Survey: Phase 1
- National Prevalence Survey: Phase 2
- Prison Study
- Longitudinal Follow-up of the 1991 National Survey Phase 2 Participants
- Synthesis Report and Framework for Future Studies.

The NZGS has been commissioned by the Department of Internal Affairs (DIA). The Department administers New Zealand's three pieces of gaming legislation and services the Lottery Grants Board, which distributes the profits of the Lotteries Commission to the community. Most of the funding for the research comes from the undistributed profits of the Lotteries Commission (applied to the project at the direction of the Minister of Internal Affairs). Some funding also comes from the Committee on Problem Gambling Management (COPGM), an organisation with representation from all major sectors of the gaming industry and problem gambling treatment providers. Notwithstanding the sources of funding, the researcher's contract is with the Crown through the DIA, and no agency or body is empowered to control the research or its findings.

The research terms of reference were developed by the DIA in consultation with a variety of statutory, industry and national voluntary sector organisations. The intent of the research is to inform Government policy on gaming and responses to problem gambling, contribute to local scientific knowledge in the field of gambling studies and provide information relevant to stakeholder and end-user organisations that have an interest in gaming and/or problem gambling. In particular, there is a concern that there is no up to date information on the nature and prevalence of problem gambling in New Zealand, the last national study having been undertaken in 1991. Since then, accessibility to gaming and gambling options has increased in the absence of research to assess whether or not one effect of these changes has been an increase in gambling problems within the New Zealand population.

Consistent with the intent of the NZGS and the major elements of the research programme, this report provides a critical review of extant local and international research germane to the following areas:

- Studies and surveys of community gambling participation and patterns, and attitudes to different types of gambling

- Problem and pathological gambling, with a focus on conceptual and methodological issues, previous community prevalence studies and special populations, for example young people, ethnic minorities, women, prison inmates, alcohol and drug and psychiatric in-patients.

A supplementary review that will be published separately addresses the wider social and economic impacts of gambling and problem gambling, including studies that employ economic, sociological, harm minimisation and public health perspectives.

1.2 General Observations Concerning Gambling Literature

Although professionals and other commentators often assert that relatively little has been written or is known about gambling and problem gambling, there is in fact a substantial body of published literature with references dating back to earlier centuries. Wildman (1998) has recently attempted to provide a comprehensive review of this literature. He lists over 3,500 books, articles and reports. Other writers have published integrative reviews from particular disciplinary perspectives, e.g. Walker (1992) from a psychological perspective. Wildman appears to be the first to attempt to provide a more general overview.

From our reading of the literature, it is evident that contributions to the field that has, in recent years, been termed 'gambling studies', come from a very wide variety of academic disciplines and perspectives. It is also evident that while having a long pedigree, there has been an 'explosion' of publications during the past decade. Indeed, almost half of the references cited by Wildman date from 1985. A further observation is that, in common with other emerging disciplines, there is a lack of theoretical integration, in general and within more specific topic areas. Wildman (1998) puts it thus:

> The literature on gambling is the most disconnected, confused mass of materials that I have ever come across. The relevant works are written in the widely different languages of various disciplines – chiefly economics, law, medicine, sociology, and psychology – and the studies employ radically different equipment and methodologies. As often as not, authors make no mention of the relevant work of other authors. The literature on gambling is a true scientific mess (p.ii).

Another feature of gambling research and scholarship is that much of it has not been published in mainstream or refereed publications. This appears to be particularly the case with economic and social impact studies and community surveys of gambling and problem gambling. Most of this research has been undertaken on behalf of state or local body governments, gambling industry organisations, or regulatory bodies. Some has been conducted by, or on behalf of, community and voluntary sector organisations. Reports of this research have typically not been published or made widely available. Consequently, much of the relevant literature is 'grey' – i.e. it is not readily locatable through library and other electronic bibliographic systems.

There have, however, been recent attempts to bring together sections of literature that relate to particular specialty areas or jurisdictions. Some of these are relevant to this review. For example, the Journal of Gambling Studies has brought out special editions on particular topics including problem and pathological gambling. The Harvard Medical School Division of Addictions has published a meta-analysis of problem gambling prevalence research conducted in North America (Shaffer, Hall, & Vander Bilt, 1997).

A recent Victorian Casino and Gaming Authority report provides a critical synthesis of problem gambling prevalence research internationally (Dickerson, McMillen & Hallebone et al, 1997). This includes an overview of Australian and New Zealand prevalence studies. In addition, the Authority has commissioned and published a significant body of research on economic and social aspects and the impacts of gambling and public perceptions of gambling in the Australian state of Victoria. Overviews of findings from the Commission's wide-ranging research programme are available (Auditor General of Victoria, 1998).

The New Zealand Department of Internal Affairs has produced a number of integrative reports on various aspects of gambling in conjunction with the New Zealand Review of Gaming (Department of Internal Affairs, 1995a; 1995b; 1995c; 1995d; 1995e; 1995f; 1995g; 1996). The Department has also commissioned and published five-yearly population surveys of gambling participation and public attitudes towards gambling. The latest report contains a summary of findings from two previous studies (Reid & Searle, 1996). Currently, the Department is compiling a comprehensive literature review on the social and economic impacts of casinos (Perez, in press). The New Zealand

Casino Control Authority has commissioned and recently published a report on the impact of the introduction of casinos to New Zealand (Australian Institute for Gambling Research, 1998).

All research takes place within and is influenced by a particular sociocultural context. Gambling participation and expenditure has increased markedly in many parts of the world during the past two decades. This expansion has occurred in association with rapid growth in gambling research, especially research on economic, social and psychological aspects. As gambling markets have matured, competition between the various sectors of the gambling industry has intensified. This growth has also been accompanied by a backlash opposed to gambling.

In a number of countries, anti-gambling lobby groups are now well established (Goodman, 1995; McMillen, 1996a). Consequently, gambling research has increasingly been conducted within social settings characterised by conflict between pro- and anti-gambling forces (Shaffer, 1997). Opposing 'sides' have drawn selectively on research findings to support their particular ideological positions and, according to Shaffer (1997), a number of contemporary researchers have been "caught in the crossfire". McGowan (1997) has asserted that one consequence of this polarisation is a tendency for a significant amount of gambling research to be biased, with "anti-gambling researchers" focusing predominantly on individual and social costs of problem gambling and "pro-gambling researchers" focusing on economic and associated social benefits. He claims that this has resulted in a body of research that "tends to overestimate both the costs and benefits of gambling". Horn (1997) has argued that while some researchers and their resulting research may be biased, a greater concern is a growing reluctance of researchers to communicate openly in the public and policy arena for fear of being labelled pro- or anti-gambling.

In addition to the politically and emotionally charged context within which gambling research occurs, consideration should also be given to the ethics and methodology of the research per se. Scientists are under an ethical obligation to publish their research in a format that facilitates replication, verification and exposure to critique. As indicated, much of the research on problem gambling and the economic and social impacts of gambling has not been published in peer reviewed journals. From our examination of this literature, it is evident that the reporting of both methodology and substantive findings are often incomplete. In many cases this precludes replication and verification. These shortcomings are of even greater concern when it is evident that a large number of studies are funded by industry sources and when there is background suspicion of pro- or anti-gambling bias on the part of funding organisations and researchers.

Henriksson (undated) has been explicit regarding concerns about industry and political agendas intruding upon the research process. He writes:

> the domination of research funding by gambling promoters (including governments) is overwhelming. At a time when stable employment and funding is often hard to come by, few researchers (or institutions) can afford to risk alienating these sources (p.3).

Elsewhere, evidence has been presented with respect to a Canadian provincial government that has funded research that grossly inflated the benefits of gambling growth while underplaying the costs (Henriksson & Lipsey, in press). Others have argued that researchers whose findings are regarded as unfavourable have been threatened by industry and political gambling promoters (Ferrel & Gold, 1998).

From their review of North American studies of problem gambling prevalence, Shaffer, Hall & Vander Bilt (1997) identified various methodological shortcomings. They noted that "the overall methodological quality of disordered gambling prevalence research has not improved during the past 20 years." Other reviewers have also commented on methodological shortcomings that weaken the conclusions that can be drawn from individual studies and compromise efforts to build integrated bodies of knowledge (e.g. Gambino, 1997; Walker, 1992; Yaffee & Brodsky, 1997). There has also been little use of more sophisticated methods and statistical analyses that are now routinely used in epidemiology and some other areas of social science (Yaffee & Brodsky, 1997).

These shortcomings led Gambino (1997), somewhat provocatively, to conclude:

> There is to date no convincing evidence that social costs and other negative impacts outweigh economic and other social benefits. In addition there is no compelling evidence that social costs may be caused by the introduction and subsequent development of casino or other forms of wagering in a new environment (p.294).

The debate and lack of certainty will not be resolved until there is a more substantial body of tight, well designed research that is published in peer reviewed journals.

1.3 Review Procedures

As indicated above, the present review is not comprehensive. It is selective. To reiterate, its primary focus is on those areas most relevant to the 1998-1999 New Zealand Gaming Survey research programme. Its main objective is to inform the design and interpretation of this research.

The following procedures were used to locate potentially relevant literature:

- Literature searches using electronic bibliographic indexes
- Internet searches
- Perusal of the holdings of specialist libraries
- Requests for information from individuals and organisations
- Examination of previous general and topic specific reviews
- Accessing professional and informal networks
- Obtaining additional information identified from the sources listed and from further publications located via these sources.

Electronic Indexes

The following were searched: ProQuest Social Sciences Index (1988-1998), Sociofile (1974-1998), PsychLIT (1967-1998) and Index New Zealand (1987-1997).

ProQuest, an index of social science publications available in the Auckland University of Technology Library was searched with 'gambling' as the keyword. One hundred and forty-two items were located for the ten years covered.

Sociofile, an index of international social science literature, was searched using 'gambling' and 'pathological gambling' keywords for the period 1974-1998. 'Gambling' generated 164 references; 'pathological gambling' 65.

PsychLIT, which indexes a large number of psychological and psychiatric journals, was searched using 'gambling' and 'pathological gambling' keywords for 1967-1998. For the 20 year period 1967-1987 there were 176 'gambling' and 76 'pathological gambling' entries. For 1988-March 1998 the corresponding figures were 163 and 370, reflecting the recent expansion of the psychological and psychiatric literature on gambling and problem gambling.

Index New Zealand covers popular as well as academic, trade and professional publications published in New Zealand. Three hundred and twenty-seven gambling references were identified for the ten year period searched.

There were varying degrees of overlap between these indexes. PsychLIT and Sociofile in particular evidenced a moderate degree of concordance.

Abstracts and/or copies of publications that appeared to be relevant to the focus of the review were obtained in hard copy or accessed electronically and viewed.

Internet Searches

A variety of relevant internet sites were accessed and reports and articles downloaded.

Perusal of Holdings in Specialist Libraries

The reviewers had access to substantial personal libraries on gambling and related topics. Professor Sten Ronnberg, from the University of Stockholm, also provided a listing of 608 references held in his personal library. These holdings contain many reports that have not been published in the mainstream literature or that are difficult to obtain. They include pre-publication reports and articles from a variety of sources. Where relevant, this material was drawn on for the review.

The New Zealand Department of Internal Affairs has a specialist library on gambling, including problem gambling. A listing of 133 publications was obtained. Relevant items were borrowed or copied for further examination.

Requests for Information

During the initial consultation process, many individuals and organisations with an involvement or interest in gambling were contacted to describe and discuss the research programme. In addition, their advice on the location of information related to the major research topics was also sought. Specifically, over 20 Australian gambling researchers, clinicians and organisations were contacted. Approximately half responded and either recommended or provided copies of relevant publications. Some, including the Victorian Casino and Gaming Authority, sent listings of research reports that they had commissioned and/or published. Some described work in progress and forthcoming publications. This consultation also involved telephone and/or face-to-face interviews with approximately 60 representatives of New Zealand stakeholder groups. In all instances interviewees were asked if they had or knew of documented information that might be relevant to the planned research and where it could be obtained. A number of relevant publications were identified and in most instances located.

General and Topic Specific Reviews

Some review publications, such as those indicated in Section 1.2, were particularly useful in obtaining an overview of specific topics and locating additional references.

Professional and Informal Networks

The international communities of leading gambling researchers, industry executives and regulators, and treatment specialists are, for the most part, well networked via electronic mail and professional meetings at national and international levels. These networks were an additional, significant source of information for the review.

Obtaining Additional Information

Information obtained from all of the above sources gave rise to further references that were sought and usually secured. In some instances, this required persistence and took considerable time. Obtaining copies of all of Australian state-level surveys of problem gambling was a case in point.

1.4 Some General Comments on Research and Research Methodology

Introduction

The present review seeks to provide a critical synthesis of relevant sections of gambling studies literature. This necessitates careful consideration of substantive findings in terms of the assumptions underlying individual studies and the methods used to collect and analyse data. For this reason, we consider it necessary to give some prior consideration to research methods used in the social sciences and their respective strengths and weaknesses.

An assumption underlying all scientific investigation is that there is an external reality and that it is possible to increase our understanding of this reality by way of careful observation and interaction with it. Observation and experimentation require valid, specific measurement of the phenomena under investigation. Other suitably qualified researchers should be able to repeat these measurements. External reality is not experienced directly. Measurement, observation and hypothesis formation all involve representation of presumed external reality by symbols, primarily words and numbers. Representation of aspects of external reality by symbols is referred to as abstraction. 'Atoms,' 'ecosystems,' 'gambling' and 'pathological gambling' are examples of concepts that have been invented to help represent and make sense of aspects of the physical and social world. Understanding and explanation involve the development of theory or models that integrate prior observations and findings. Theory gives rise to additional questions and predictions that provide a focus for further research and the refinement of theoretical understanding.

In many domains of scientific inquiry there are multiple theories which compete and/or provide different understandings or sets of explanations. In some fields there are general, complex theories that explain a wide variety of phenomena. However, all theories are partial. In the social and behavioural sciences, general, integrative theories are rare. Typically, particular topics are viewed from multiple theoretical perspectives embedded within a variety of academic disciplines. Theories come and go. Some are replaced or subsumed by new, more powerful theories. Others, like old soldiers, quietly fade away as interest shifts elsewhere. No theory is valid in an absolute sense. The validity of theories is perhaps best assessed in terms of their 'goodness of fit' or utility - how well they accommodate existing findings and generate testable hypotheses and predictions that lead to enhanced understanding and/or have practical significance. In addition, there is general agreement that when there are competing theories, other things being equal, preference should be given to the simplest hypothesis or theory that explains the phenomena that is being considered.

All research begins with observation and/or questions about a particular topic guided by existing theory and previous research. Research is a human undertaking and is shaped to varying degrees by multiple factors that influence the behaviour and thinking of individuals. These factors include the general historical, political and sociocultural context within which the research is located, the scientific discipline of the researcher, previous knowledge about the particular topic area involved and the methods or approaches that have been used in the past.

Research within the social, behavioural and health sciences can be divided into two broad categories; quantitative and qualitative. The studies examined in this review are predominantly quantitative and for that reason greater emphasis is given to discussion of this type of research.

Quantitative Research

A wide variety of methods are used in quantitative research. In the social, behavioural and health sciences, most methods can be classified within the following categories: (1) naturalistic observation; (2) field research; (3) laboratory experiment.

Naturalistic observation involves careful measurement and assessment of behaviour or other phenomena as they occur in their real-life setting. The researcher attempts to minimise any influence

of his or her own presence. This approach is commonly employed by ethologists to study animal behaviour and social anthropologists to understand small-scale human societies and aspects of other social systems. Many qualitative studies also use this methodology and related approaches such as participant observation. Quasi-naturalistic research can also be included here. This type of study places animals or people in situations designed to simulate their naturalistic environment. For example, rather than observing jury members in a criminal trial, a jury situation could be simulated and relatively unobtrusive observation assisted by one-way mirrors or video recording.

Laboratory experimentation involves the study of behaviour or other phenomena within artificial settings constructed by the researcher. One or more features of the situation are varied under highly controlled conditions that attempt to hold other factors constant. This allows effects of the experimental manipulation (variation made to an independent variable) on the behaviour or attribute of interest (dependent variable) to be determined. Typically, this is accomplished by employing a control group that is treated similarly to the experimental group except for exposure to the experimental manipulation. However, there are a wide variety of experimental designs that differ in the degree to which they allow relationships between variables to be evaluated and causation inferred (Mahoney, 1978). Laboratory studies, while facilitating rigorous examination of linkages between variables of interest, are by definition contrived situations. In many instances, it is uncertain to what extent experimental findings can be generalised to other contexts. In other words, while well designed laboratory experiments may possess high internal validity, they often lack external validity.

Naturalistic and experimental research can be considered to lie at opposite ends of a continuum of control - the degree to which the researcher manipulates or determines the conditions under which subjects or participants are observed. A great deal of research occurs between these two extremes and is commonly referred to as either field or applied research. This form of research contains aspects of the two general approaches already described. Like naturalistic investigation, applied research is usually undertaken in a natural or quasi-natural setting (the field). However, it differs from naturalistic research in that its scope is generally narrower and some specific aspect is the focus of study. It also differs from naturalistic investigations in that the researcher actively intervenes in the data collection. In contrast to experimental research, the researcher has less control over the environment and its influences on the phenomenon that is being studied.

Williams (1969) maintained that research can also be classified according to a second dimension that may be regarded as orthogonal to (independent of) the control dimension just referred to. This second dimension concerns the degree to which measurement units are imposed by the researcher upon the phenomena under investigation. While spanning the full spectrum, field research also tends to lie between the two extremes in this regard. Common methods used in applied research are surveys, correlational investigations, longitudinal studies and field experiments.

Meyers and Grossen (1978) define surveys as “any procedure involving the investigator entering a subject population and measuring some specific set of responses. In this technique you will find neither the manipulation of an independent variable nor the setting-up of a control condition” (p.191). Surveys may be thought of as probes to gauge the state of a population at a given point in time. They commonly involve the use of questionnaires (completed individually, in group settings or delivered by mail) or interviews (conducted face-to-face or via telephone). By repeating surveys it is possible to examine trends or changes in attitudes, reported behaviour and health indices within populations over time.

Correlational investigation usually also involves the collection of information via surveying a particular population. In addition, information is gathered on a number of measures with the intention of determining the nature and extent of relationships between the variables assessed by these measures. A variety of statistical procedures, e.g. partial, multiple and canonical correlation, logistic and linear regression, and factor analysis, enable the statistical control of variables of interest and the testing of specific hypotheses.

Correlation and related methods are also used in some experimental studies, in conjunction with other statistical procedures. They are also commonly employed to examine relationships between measures that are derived from existing data sources, e.g. archival or official records of births and deaths, in- and out-migration, labour force participation, reported crimes and income levels. Analysis of this type includes exploring relationships between multiple measures at a single point in time and/or over time. Much research undertaken in the fields of demography, economics and sociology is essentially correlational.

Although generally considered a branch of the humanities rather than a social science, historical research also frequently draws on information from past official records and sometimes examines statistical associations between variables. Historians also utilise a diversity of other sources of documentation from earlier times, e.g. parliamentary transcripts, legislative changes, the mass media, and personal biographies, and use predominantly qualitative methods to examine relationships between past events and changes over time.

Longitudinal research involves repeated assessment of the same sample of respondents over a prolonged period of time to examine development and change. Typically, a relatively small number of participants are studied intensively with respect to particular aspects of their behaviour or health status. This type of investigation may include individual case studies as well as correlational and a variety of other forms of statistical analysis, e.g. time series analysis, to investigate complex relationships between variables, both cross sectionally (at a given point in time) and longitudinally (changes over time). When repeated measurements are made using the same participants, it is possible to statistically control for individual differences that often complicate the interpretation of information from cross sectional correlational studies.

'True' longitudinal research is prospective. That is to say, measurements of interest to the investigator are made from the outset of the study and then repeated on one or more subsequent occasions. Often, retrospective accounts are used as a proxy for prospective study. In other words, respondents are asked about aspects of their behaviour or health status in the past and these accounts are then compared with their current situation. While having some advantages in terms of efficiency and cost, there is often a problem with the validity and reliability of retrospective measures, especially when they relate to events and circumstances that took place in the more distant past.

Field experiments are true experiments in that they involve the use of an intervention or interventions on the part of the investigator, a control group or groups, and measurement of change in dependent variables. The difference is that the experiment is conducted in the participants' natural environment. The major advantage of this approach, in addition to the benefits that flow from experimental methodologies generally, is that the findings are more likely to be valid in the 'real world.' For both practical and ethical reasons, field experiments are usually difficult to conduct. Outside the laboratory it is seldom possible to rule out or control for the effects of other factors (so-called extraneous or confounding variables) on the behaviour or other variable of interest.

Treatment outcome evaluations or clinical trials are perhaps the most common variety of field experiment. Although usually involving an assessment of change over time in treated (experimental) and untreated or placebo (control) groups, a number of special single-case experimental designs have been developed to enable interventions for individuals to be assessed more rigorously than is possible with traditional case study methods (Kazdin, 1978).

Occasionally, so-called 'natural' experiments have been conducted. This occurs when some change in a relevant independent variable takes place fortuitously (i.e. not instigated by the investigator) yet can be evaluated by way of an experimental study involving appropriate 'intervention' and control groups.

An example of a natural experiment can be given from the current New Zealand Gaming Survey.

Abbott and Volberg (1991; 1992; 1996a) conducted a national survey of gambling and problem gambling in New Zealand prior to the introduction of casinos to two major cities, Christchurch and Auckland. Apart from telephone interviews with a large national sample, the study included face-to-face in-depth interviews with selected subgroups of respondents predominantly domiciled in Auckland, Christchurch and the Wellington-Hutt metropolitan areas. A casino has not, to date, been introduced to the latter urban centre. The majority of the 1991 Phase 2 respondents have recently been re-interviewed using identical measures to those employed prior to the introduction of casinos to two of the three centres. Thus, it may be possible to assess some aspects of the impact of the introduction of casinos by comparing those respondents who have continued to reside in cities with casinos with those who have resided elsewhere. This will be done by comparing the 'experimental' (casino) and 'control' (non-casino) groups on a variety of gambling and gambling-related problem measures both before and after the introduction of casinos. In addition, change over time will also be examined within each group. If the groups did not differ significantly from each other on relevant measures in 1991, but do in 1998, it can be tentatively concluded that this difference occurred as a consequence of the introduction of casinos. However, to be stated with confidence, it will be necessary to rule out any likely alternative explanations such as those that might result from confounding variables over which the investigator did not have control.

Natural experiments typically carry with them the advantages and disadvantages indicated above for field experiments. The example just cited also exemplifies longitudinal and correlational approaches in that the study includes an examination of change in gambling behaviour over time in the same individuals and employs statistical analysis of relationships between a large number of independent and dependent variables both cross-sectionally and longitudinally.

Measurement

All of the research approaches indicated are concerned with the identification and description of phenomena and the examination of co-variation between them with a view to increasing understanding and prediction. All involve measurement of one of two general types – nominal or continuous. Nominal measurement involves naming things differently, e.g. a person is deemed to be clinically depressed or not clinically depressed, male or female. Continuous measurement requires the use of scales and the assignment of numbers to represent 'things.' To return to the example of depression, rather than categorising a person as depressed or non-depressed, one of the various scales designed to measure the severity of clinical depression could be used and each individual given a score which might range from zero to 20. This allows this person or a group to be compared with others or with themselves over time.

Continuous measurement usually enables more fine-grained examination of the phenomena under investigation. In large part this is because it facilitates the application of a variety of statistical measures to assist with the exploration and testing of relationships between variables of interest. Other statistical procedures, so-called non-parametric methods, are available to assist with the examination of some types of nominal data. For all types of scientific investigation it is important to know how reliable and valid the measurements are in the particular study context.

Reliability is essentially the consistency of the measure - the degree to which it would produce the same results under similar conditions. Validity refers to the degree to which the measure assesses what it is intended or claimed to measure. Validation is an ongoing process in that the findings of virtually all research have a bearing on the meaning or interpretation of the measurements used in a particular study. Messick (1995) puts it thus "…validity is based on an integration of any evidence that bears on the interpretation or meaning of the test scores" (p.742). He continues:

> Almost any kind of information about a test can contribute to an understanding of score meaning, but the contribution becomes stronger if the degree of fit of the information with the theoretical rationale underlying score interpretation is explicitly evaluated. Historically, primary emphasis in construct validation has been placed on internal and external test structures - that is, on the appraisal of theoretically expected patterns of relationships

> among item test scores or between tests and other measures. Probably even more illuminating in regard to score meaning are studies of expected performance differences over time, across groups and settings, and in response to experimental treatments and manipulations (p.743).

Besides reliability and validity, sensitivity (or responsiveness) to change is becoming increasingly recognised as an important attribute of psychometric measures. However, this depends on the phenomena under consideration. For example, if a measurement was intended to index something that does not change, e.g. whether or not a person had experienced clinical depression at some time during their lives, it would be problematic if it did change over time. Indeed, its reliability as a lifetime measure would also be compromised. On the other hand, if a measure of current depressed state was not responsive to change, it would not be a valid index of this clinical construct.

Causal Inference

Although identification of systematic co-variation is required to enhance understanding of phenomena of interest and is necessary for making predictions, it is not sufficient for the inference of a cause-effect relationship. This is another way of referring to the frequently stated assertion that correlation between two or more phenomena does not establish causation. Although consideration of the philosophical and technical bases of causation is beyond the scope of this review, scientists generally consider all of the following to be necessary for the demonstration of a causal relationship:

- the events or phenomena occur together in time
- the cause must precede the effect
- observed instances of the cause do not occur without the effect
- all other possible influences other than the one being investigated are excluded or controlled
- the relationship can be replicated on other occasions by other investigators.

From this list, it is apparent why experimental studies play an important role in examining causal relationships. They are particularly valuable in reducing or controlling for extraneous factors that may influence or determine the effect under study. However, this does not mean that non-experimental correlational research is uninformative, or that experiments are definitive. Even the best designed experiment is incapable of conclusively proving a cause-effect relationship. Science progresses by subjecting theories to risks of refutation and correlational research can disconfirm hypothesised relationships.

Our confidence in the explanatory power and utility of particular theories and hypothesised causal linkages increase when they have been repeatedly subjected to risky (rigorous) tests and have not been disconfirmed. The foregoing was succinctly stated by Albert Einstein - “no amount of experimentation can ever prove me right: a single experiment can prove me wrong” (Wynn & Wiggins, 1997, p.107). Corroboration is the technical term for surviving refutation (Meehl, 1978; Popper, 1962; 1972). In longitudinal correlational studies, it is possible to specify the temporal sequence of events. This is important in inferring (and corroborating) cause and effect relationships. In cross sectional studies, when a statistically significant relationship is found between variables, it is not possible to be certain what way the causal influence runs - i.e. which variable is the likely cause and which is the effect. However, correlational designs can statistically control for the effects of other factors considered likely to influence the phenomena under investigation. They may also be used to model and test complex relationships between multiple variables at a given point in time or, in longitudinal investigations, over time.

Sampling

In addition to measurement, sampling is another important feature of all research that requires careful consideration and has a bearing on the quality and significance of any given investigation.

Scientists are primarily interested in building theoretical models that have wide applicability. However, for practical and resource reasons, research is usually undertaken with small or moderately sized groups of individuals, events or situations. This means that inferences must be made from the particular to the general or universal.

Traversing the path from the particular to the universal involves running a gauntlet of philosophical and technical hurdles (Deutsch, 1997). Perhaps the most critical consideration is the degree to which the group or sample involved in a particular study is representative of the wider population that the investigator wishes to generalise the findings to. Where possible, it is desirable to select a sample that is random and independent. This means all individuals in a population have the same probability of selection and the choice of any one individual does not affect the selection of any other.

A number of the statistical procedures that are used to estimate error terms or confidence intervals associated with the findings of sample studies are based on randomness and independence assumptions. So too are the most widely used tests of significance, which incorporate these estimates. In practice, violations to these assumptions are typically ignored by investigators. As a consequence, the findings of their studies may be erroneous.

In some fields, heavy reliance has been placed on a relatively narrow sample base. For example, there probably remains some truth to the quip that experimental psychology can be defined as the study of the behaviour of highly inbred strains of white rats and North American psychology undergraduates. With respect to psychological research in New Zealand, one of the authors made a similar point some years back in an article based on an address that was originally titled 'Not only their rats are white' (Abbott & Durie, 1986). It cannot be assumed that findings from incidental or convenience samples of this type can be generalised to the wider population.

Research Quality

Mahoney (1978), drawing on previous methodological critiques by others, identified what he considered to be the ten most common "culprits in experimental inadequacy" (p.663). Most of these shortcomings also apply to what has been referred to above as field studies. Mahoney's list includes the following:

- selection of a theoretically irrelevant hypothesis or issue
- use of a sample that is very small or unrepresentative of the population to which generalisations are to be drawn
- the absence of random allocation to the various experimental conditions (in the case of between-subjects designs, where experimental and control groups are compared)
- poor specification of the independent variables
- inadequate standardisation, assessment, or description of how the independent variable was implemented
- inadequate control for factors other than those of immediate experimental interest
- inadequate replication of the cause-effect relationship
- poor choice, specification, or assessment of all relevant dependent variables
- inadequate data representation
- conclusions or interpretations that are not logically warranted by the experimental procedures.

This list summarises a number of key issues mentioned or discussed in this section of the review. Additionally, it serves as a checklist or template against which to assess quantitative research generally, including gambling research. Maher (1978) provides a somewhat more detailed list - compiled as a quality guide for the preparation and assessment of research reports. Although directed at clinical researchers, it is relevant to other areas of behavioural and social research.

Qualitative Research

Consideration of research approaches to this point has focused on quantitative investigation, with only passing reference to qualitative methodologies. Mention was made of nominal measurement, where phenomena are differentiated or classified on the basis of qualities or attributes that are not represented by a numerical value. Qualitative research refers to a variety of approaches and methodologies that are based on nominal rather than quantitative representation of phenomena of interest to the investigator. Qualitative research is widely used in most social science disciplines and the humanities.

Many qualitative researchers recognise that the use of quantification and the representation of social phenomena by numbers that are then subjected to statistical analysis has distinct limitations. They maintain that the application of methods resting on philosophical assumptions and procedures from the physical sciences provide a limited or distorted account of the human social world. A score on a measure designed to index the severity of clinical depression, for example, could be said to do little to represent the complexity of the thoughts and feelings of the individual who has filled out a questionnaire or completed an interview with a clinician. Combining this score with scores on the same scale from hundreds of other individuals may be seen as further removing the focus of investigation from the 'lived experience' of people who, among other things, suffer from forms of distress and disability that clinicians currently define as major depression.

Bannister et al (1994) define qualitative research as:

> the interpretative study of a specific issue or problem in which the researcher is central to the sense that is made….Qualitative research is (a) an attempt to capture the sense that lies within, and that structures what we say about what we do; (b) an exploration, elaboration, and systematisation of the significance of an identified phenomenon; (c) the illuminative representation of the meaning of a delimited issue or problem (p. 2-3).

Qualitative methods, for example case studies and ethnographies, have a long tradition within mainstream social and health sciences. Participant observation, in-depth interviews, focus groups, journal writing, and examination of existing records from the mass media, literature and personal diaries are all commonly employed. Efforts are usually made to keep close to the behaviour and language of the individual or group that is under study, rather than employ high order technical concepts or mathematical symbols to represent and examine phenomena of interest. Typically, rich descriptive accounts, emphasising the meaning people give to their behaviour, are provided by qualitative studies.

As with quantitative research, reliability, validity and representativeness are important matters to consider and can be particularly problematic in qualitative investigation. For example, there are instances where social anthropologists have provided widely divergent accounts of the same village or community.

Qualitative researchers, in common with most quantitative researchers, typically advocate the use of multiple methods to examine a particular topic. If similar or convergent themes or conclusions emerge from studies that take different approaches, confidence in the findings increases. This is referred to as triangulation. Triangulation also has relevance to quantitative research and there appears to be widespread support, in rhetoric if not in reality, for the desirability of combining quantitative and qualitative methods to generate more adequate understanding within a variety of academic and professional disciplines. In practice, there appears to have been an increase in the use of mixed methodologies within the social and health sciences. The authors of this review are advocates of this approach and the use of triangulation within and across qualitative and quantitative research methodologies.

The Application of Research Findings

To this point, consideration has been given to the question, "knowledge from what?" - the ways in which research is conducted. Another major question is "knowledge for what?" - the reason why research is conducted. No doubt there are many reasons. However, to a significant degree it is driven by curiosity on the part of researchers - the desire to increase knowledge about and understanding of the world and wider universe we live in. Another major driving force behind research and the funding of research stems from its potential for technological application or to help answer questions of relevance to policy makers in government, industry and other sectors of society. Whether or not the findings of research are subsequently drawn on for these purposes is also multiply determined. Often, some form of benefit/risk or cost/benefit analysis is involved in making such decisions. If, according to one's value system (i.e. what things are considered relevant and important), it is considered likely that more can be gained than lost from applying information derived from research, it will probably be utilised. If, according to one's value system, it is likely that more will be lost than gained, it will probably not be utilised. Similarly, if the loss appears to be similar to the gain, the information will probably not be applied. Usually, expected gains are required to greatly outweigh possible losses before information is acted upon and changes made to the status quo (Wynn & Wiggins, 1997).

In complex societies there are multiple stakeholders in almost any issue, with differing agendas and world-views. Consequently, research findings are considered through a plethora of value frameworks. Findings can become highly charged politically and may be ignored or challenged by individuals or organisations that anticipate some loss from their application. Stakeholders with strong agendas are also likely to selectively interpret research findings in accordance with their particular interests and use them to further their objectives. In this situation, which prevails with respect to many areas of science, the widespread application of information may ultimately be a political decision determined by the relative social power and influence of major stakeholders and constituencies.

1.5 Gambling Research Revisited

All of the various general approaches and methodologies outlined in the previous section have been used to investigate at least some aspect of gambling behaviour. For this reason, most of the shortcomings and criticisms that apply to research methods within the behavioural, social and health sciences generally are also applicable to studies of gambling. One consequence of these shortcomings in many areas of investigation is a lack of the theoretical integration and cumulative development that is characteristic of disciplines like nuclear physics, genetics and astronomy. As Paul Meehl put it over 20 years ago in an article that retains its cogency today, "…(theories) tend neither to be refuted nor corroborated, but instead merely fade away…" (Meehl, 1978, p.806). Andreski (1972) and Meehl (1978) outline subject matter and methodological reasons for this. While recognising these shortcomings, this does not mean that the findings of this research are without validity and practical utility. They are generally an advance on 'common sense' or 'folk knowledge' about the topics in question, or on what might be concluded from other, non-scientific approaches to gather information and reach decisions. Furthermore, few would advocate that attempts to apply rigorous methods should be abandoned because the subject matter is inherently difficult to get a grip on and negotiate.

Earlier in this review, Wildman's (1998) general assessment of the broad gambling studies literature was quoted. He asserted that the literature was "the most disconnected, confused mass of materials" he had ever come across and that it is "a true scientific mess." However, Wildman did not say which other areas of scientific literature he had examined in similar depth. Although the present authors share some of his concerns regarding the overall state of gambling studies, we are aware of many areas within the social sciences that could be described similarly. As Meehl (1978) and Andreski (1972) have argued, "disconnection" and "confusion" tend to be characteristic of substantial bodies of research across a number of disciplines.

In his overview and critique of psychological studies of gambling, Walker (1992) identifies two methodological issues that he considers particularly relevant, namely ecological validity and biased sampling. Both have been touched on earlier in this review, where the former was referred to as external validity. While Walker concludes that they are especially problematic in the gambling literature, they are also of concern in most areas of psychology and the social sciences.

Gambling comes in many forms and takes place in a variety of social settings such as retail outlets, hotels, clubs, casinos, race-tracks and, increasingly at home via the telephone, television and Internet. Gambling involves real money and real risks of winning and losing. It is undertaken by a wide diversity of people with varying attitudes and experience related to gambling. Walker (1992) cautions "…there is a great danger that studies conducted with students in simulated gambling environments for bogus money, small prizes, or course credit, will yield nothing of relevance to the real gambling of genuine gamblers in their natural environments" (p.12). A large number of experimental studies of this type have been conducted to investigate aspects of gambling behaviour. While often having satisfactory internal validity in terms of experimental rigor, as Walker contends, they have highly questionable external validity. In part this is also because they involve limited or biased sampling.

In considering problem and pathological gambling, Walker (1992) notes that many studies have involved obtaining retrospective accounts from people receiving treatment or participating in Gamblers Anonymous (GA) groups. He correctly concludes: "the use of gamblers in treatment or gamblers who may not have gambled for many years, for studies of causation or even description of the phenomena of heavy gambling, brings with it the risk of two kinds of errors: errors of memory and errors of interpretation" (p.13). As indicated earlier in relation to retrospective studies generally, this approach always carries the potential for errors in the recall of past events. By errors of interpretation, Walker means retrospective interpretation or distortion of recall of the past that arises as a consequence of the particular treatment process experienced. This phenomenon had been found previously to result in misleading accounts of alcohol dependence with unfortunate consequences for both the advancement of scientific understanding of this disorder and its treatment (Abbott, 1979; Abbott et al, 1991). As Walker notes, others have also called for caution in this regard, including Oldman (1978), who provided supporting evidence specific to problem gambling.

Consistent with the foregoing, the present authors agree with Walker's (1992) contention that in assessing gambling research, relatively more weight should be given to field studies of "genuine gamblers" than to laboratory studies of students or non-gamblers or to retrospective studies of gamblers in treatment.

With respect to the problem and pathological gambling literature, Abbott and Volberg (1996a) concluded that a major weakness is the reliance that has been placed on cross sectional correlational studies and relative lack of field research employing longitudinal, experimental and quasi-experimental designs that allow stronger causal inferences to be drawn. They also called for greater use of qualitative studies to complement these quantitative methods and for the adoption of statistical procedures that are now widely used in epidemiology.

Before concluding this section, we return briefly to a consideration of Gambino's assertion that there is no convincing evidence that the negative impacts of gambling outweigh the benefits or that such negative impacts are caused by the introduction and expansion of gambling. From our examination of the research literature, we have no doubt that both costs and benefits have been shown to be associated with various forms of gambling in a variety of sociocultural contexts. However, we agree that concluding that the costs outweigh the benefits (or vice versa), either in aggregate or in a specific situation, is more problematic. In large part this is because the necessary integrative research, incorporating large numbers of relevant variables, has not been conducted. As indicated above, a further reason is the methodological deficiencies in many gambling studies. Gambino's other point, namely that causal relationships between gambling and social costs have not been convincingly demonstrated, requires further consideration.

As discussed previously, establishing causation conclusively is particularly difficult. Strictly speaking, hypotheses or theories are never proven and always remain tentative. To reiterate, scientific inquiry does not work this way. Rather, studies are designed to expose hypothesised relationships to risks of refutation. If the predicted relationship is not demonstrated, the hypothesis is rejected. Technically, it has been falsified. However, if it is not rejected, this does not mean that it has been proven. No hypothesis can ever be confirmed if, by confirmation, we mean proof (Weimer, 1977). To claim otherwise is to commit the logical error referred to as 'affirming the consequent'. Although experienced researchers and others who refer to their findings frequently do just this, it remains an error. It also remains an error when it is implicit in the practice of scientific journal editors who almost universally display a preference for manuscripts that describe 'positive' results, i.e. studies where expected relationships have not been rejected. In fact, predictive failures have far more weight in terms of their logical implications than successful predictions. For this reason, selective publication bias has serious consequences for the advancement of knowledge. When outcomes are consistent with what was hypothesised, all that can be safely concluded is that this consistency was found or that the findings corroborate the hypothesis.

Corroboration is not proof. Rather, it means that a hypothesis has been tested and (for now) survived. As Meehl (1978) puts it "…the more dangerous tests it has survived, the better corroborated it is" (p. 817). Research designs vary in the extent to which they constitute "dangerous tests." However, even with multiple replications using rigorous research methodologies, a presumed causal relationship is never "convincingly demonstrated." But, as findings of this type accumulate, most reasonable people do experience an increase in their confidence that the relationship is robust and could be expected to hold on subsequent occasions.

Thus, causation can never be "convincingly satisfied" in the sense of absolute proof. Gambino (1997) takes the case of casino development as a predictor or independent variable, and notes that a well-designed evaluation of its impacts would first have to demonstrate that there was an association between the introduction of casinos and one or more social costs. To allow an inference of causation to be made (or rejected), he correctly notes that it would also be necessary to demonstrate that no other explanation could account for the relationship. He further explains that there are four types of potential alternate explanations. His account from this point runs as follows:

> Assume we collect our data from a set of communities which are for all practical purposes indistinguishable except that half of them have recently introduced casino gambling. These rival hypotheses are (1) the finding of a spurious or chance association (e.g., a random selection of casino sites which by chance are where the highest costs are to be found are compared with a random selection of non casino sites where, also by chance, the lowest costs are to be found), (2) bias (e.g., most of the locations where costs are high (low) refuse to participate, so that the study underestimates (overestimates) the actual costs), (3) effect-cause association (e.g., rising social costs lead to casino development), and (4) effect-effect association (e.g., changes in technology result in higher social costs by displacing workers, while making casino development a more viable and attractive source of revenue). If we can rule out these four alternatives then we may validly conclude with reasonable confidence that casino development does or does not contribute causally to the development of additional social costs (p.295).

If the proposed study adequately met other quality criteria that have been mentioned earlier, this would be a reasonably strong design to examine the hypothesis that the introduction of casinos leads to an increase in certain social costs and/or benefits. The collection of relevant information prior to the introduction of casinos and the addition of long-term follow-up measurement would strengthen the investigation from a technical point of view and make it more informative.

In practice, all research falls along a spectrum in terms of quality and fallibility. Too little of it, in gambling studies as in many other disciplines, is found near the quality end of the continuum. Probably no single study will ever excel in all respects. However, few investigations are likely to be totally devoid of information. The challenge for the reviewer is to sift through the available

literature and weigh both its component parts and a significant sample of the totality in terms of informativeness. Triangulation, the convergence of information from different perspectives on specific topics of interest, is of particular importance in this regard. While quantitative, meta-analytic syntheses of groups of related studies can assist the reviewer, the process is essentially qualitative, informed by reasoned, personal judgement.

1.6 Conclusion

As indicated, this report is not intended to provide an exhaustive review of gambling and problem gambling literature. It is selective. The focus of this selection and the procedures followed in obtaining information relevant to the review have been outlined. Some general comments on gambling research have been made by way of introduction to the more detailed consideration given to particular areas in subsequent sections. Approaches to scientific investigation and social science inquiry more specifically have been discussed and related to the study of gambling and problem gambling. This provides a template to assist the examination of the bodies of gambling research that are described and critically considered in the following sections of the review.

2. COMMUNITY GAMBLING PARTICIPATION AND ATTITUDES

2.1 Introduction

This section is primarily a summary and critical review of studies and surveys of community gambling participation and attitudes to different types of gambling. Inclusion of particular studies is guided by their relevance to the New Zealand Gaming Survey research programme and availability in English language. Additional literature is reviewed to provide a broader context within which to consider the survey findings.

More specifically, this section examines what is meant by the term 'gambling' and gives a broad historical overview of changes in gambling behaviour and attitudes towards gambling. This includes more detailed consideration of general international trends in the legalisation and expansion of gambling in the late Twentieth Century. After this overview, recent and emerging developments and forms of gambling that are expected to affect gambling participation and problem gambling prevalence during the early part of the next century are outlined. To provide increased understanding of recent gambling trends, the present organisation of gaming industries in Europe, North America, Australia and New Zealand is described. Finally, recent changes in gambling participation and attitudes towards gambling within particular populations are outlined and examined. In this latter section, relevant Australian and New Zealand literature is considered in more detail than that from other parts of the world.

From the outset it should be noted that the evolution of gambling in New Zealand has followed patterns broadly similar to the evolution of commercial gambling in Australia and numerous other Westernised countries, particularly those in Europe and North America. Recent developments in South America, South Africa and Papua-New Guinea suggest that these patterns have parallels in less developed countries as well.

2.2 Gambling Defined

In this review gambling and gaming are used as synonymous terms. The former term tends to be favoured by researchers while the latter, more innocuous, term tends to be favoured by gambling operators. Some people use the term 'gaming' to refer to all forms of gambling in which the result is determined entirely by chance, such as Lotto or gaming machines, as distinct from 'wagering' on the outcome of activities such as horse racing, or sports events where knowledge and skill are more likely to be involved. Others employ the term 'gaming' in an attempt to distinguish relatively 'harmless' forms of gambling, such as raffles or Lotto, from forms considered more harmful, such as gambling on gaming machines or in casinos. Whatever term is used, it is important to understand that it is not a single, undifferentiated phenomenon but rather a collection of a variety of somewhat distinct behaviours. The common thread is that all of these activities involve risking the loss of something of value in exchange for the opportunity to gain something of greater value (Thompson, 1997). Other authorities have provided similar definitions, e.g.:

- Risking money in order to win money on an outcome that is wholly or partly determined by chance (Walker, 1992)
- Betting or wagering of valuables on events of uncertain outcome (Devereux, 1968)
- Staking money on events driven by chance (Productivity Commission, 1998).

While there appears to be general agreement about what constitutes gambling, all of the above definitions are unsatisfactory in that they also include other moderate to high-risk activities. Starting a new business or investing on the stock market, for example, could be included. However, most people do not regard these activities as gambling in the sense that it is addressed in this review because while the outcome of these activities may involve chance, they are not specifically designed to part investors and their money. Gambling, as it is typically considered in scientific, industry and

public discourse, is presented as a form of entertainment or recreation. In addition, consideration is usually confined to those activities that are widely perceived as gambling and/or are defined as such by statute or for taxation and regulatory purposes.

The term 'gambling' is a concept or abstraction that groups certain phenomena together and excludes others. As indicated in Section One, this form of categorisation can be regarded as a type of nominal measurement. However, as just mentioned, gambling is a broad concept. It includes a diversity of activities that are conducted in a wide range of settings, appeal to different sorts of people and are perceived in a variety of ways by participants and observers. Some forms include an element of skill while others do not. In other words, it is not a homogenous or unitary activity. Failure to appreciate this diversity can be expected to limit scientific understanding of gambling. One reason to take note of this diversity stems from the accumulating evidence that some forms of gambling are more strongly associated with the development of problem gambling than others. Another is that research on reasons why people gamble, and why people say they gamble, indicates that reasons vary significantly from one form of gambling to another (Abbott & Volberg, 1992; Walker, 1992).

2.3 Gambling Types and Classification

Because of their diversity, gambling activities can be classified in numerous ways on the basis of many different characteristics. Structural differences (features inherent to the form of gambling per se) include factors such as ratio of luck to skill (both actual and perceived), event frequency or pay-out intervals, pay-out ratios, stake size, probability of winning, presence and size of jackpot, 'near miss' opportunities, cash or credit basis, knowledge needed to enter the game, intrinsic interest, degree of player participation and social or asocial nature of the activity. Contextual or situational differences include availability (e.g. number of outlets, opening times, membership or entry requirements), location, legality, type of gambling establishment, perceived safety of the setting, purpose (e.g. fundraising event), association with other attractions, whether or not alcohol is available, and light, colour and sound effects (Abt, Smith & Christiansen, 1985; Griffiths, 1998a; Volberg, Reitzes & Boles, 1997; Wildman, 1998). A recent study has suggested that background odour (olfactory stimuli) should also be added to this list (Hirsch, 1995).

Walker (1992) discusses a number of these differences in relation to each of the more widely available forms of gambling. He also examines the relative attraction of the different forms of gambling to people who take part in them. Chantal and Vallerand (1996) have identified different motivational bases for participation in some types of gambling. These accounts illustrate the difficulty involved in clearly differentiating psychological factors and individual differences from aspects of the gambling activity or situation. This should not be surprising; gambling is after all a human activity involving interaction between situational characteristics and the individuals who participate, both alone and in groups. Many types of gambling have a link to cultural and ethnic traditions.

Consistent with a number of other authorities, Walker (1992) emphasises the importance of the skill-luck dimension and uses this as his primary classificatory framework. Games of pure chance include most lottery games and housie (bingo) as well as some traditional casino-style games such as roulette. Games of mixed chance and skill include card games such as poker, blackjack and baccarat. Chess is an example of a game near the pure skill end of the luck-skill continuum. Some types of gambling require players to construct subjective probabilities of the outcome of some event, such as betting on horse racing or a rugby game.

It has been argued that activities involving an intermediate mix of skill and luck are most attractive to 'serious' gamblers and are more likely to lead to gambling problems among regular participants than other forms of gambling (Walker, 1992). These forms of gambling involve sufficient skill to allow slight modifications to the outcome but insufficient to overcome the odds in favour of the 'house.' With regard to problem gambling, they provide opportunities for escalating the size of bets, chasing losses and

both betting and losing more than intended. Some types of card games commonly played in casinos and track betting fall into the intermediate skill category.

Some gambling machine games such as video poker also involve an element of skill, although most are games of pure chance. However, as mentioned above, individual differences complicate the situation. While most gamblers perceive that they have more control when participating in games which objectively allow for an element of skill to influence outcomes, some have greatly distorted beliefs about their ability in this regard. Many gamblers believe that they can influence outcomes in games of pure chance such as roulette, lotto and slot machines (Letarte, Ladouceur & Mayrand, 1986; Scarne, 1973; Toneatto et al, 1997).

Event frequency - the number of opportunities to gamble in a specified period of time - is another of the more important differentiating features. Event frequency is usually associated with the speed at which outcomes (win or loss) are reported to the gambler and winnings are received (Griffiths, 1998a). Some types of gambling are characterised by particularly rapid cycles of stake, play and determination and offer participants intense action whereas others are much slower and passive (Dickerson, 1993). Those in the former category are often referred to as continuous forms of gambling; those in the latter as discontinuous or non-continuous (Abbott & Volberg, 1992). Although usually considered together, the speed with which outcomes are reported and winnings received may be considered as two distinct variables that could be examined separately.

Griffiths (1998a) has located forms of gambling that are widely available in the United Kingdom on an event frequency continuum ranging from very rapid to infrequent. Gaming machines (slot and video poker machines, fruit machines) and instant scratch cards (instant lotteries), with event frequencies of five-ten seconds, are located at one end. Football pools, with frequencies of seven days, are located at the opposite end. The other forms of gambling, with event frequencies in parentheses, are: roulette and blackjack (1-2 minutes), keno (5 minutes), bingo (5-10 minutes), race betting (5-20 minutes), sports betting (every few days) the national lottery (3-4 days) and football pools (7 days). This constitutes an ordinal scale, a form of measurement that allows quantitative analysis.

Griffiths also divided his scale into continuous and discontinuous categories. Sports betting, the national lottery and football pools were placed in the discontinuous category. The rest were classified as continuous. While useful, the particular ordering of gambling activities would be expected to change somewhat over time as well as differ from one country or jurisdiction to another. For example, in New Zealand, the results of a national Keno game are currently screened once a day on national television. Thus, it would be classified as discontinuous. In other contexts, as in Griffiths' classification where the event frequency is five minutes, it is appropriately defined as continuous.

There is reason to believe from research in a number of countries that the event frequency dimension is also particularly relevant to considerations of problem gambling development. This has been recognised by government agencies. For example, the United Kingdom Home Office makes a distinction between 'hard' and 'soft' forms of gambling, primarily on the basis of the rapidity of staking (Home Office, 1996). Of the various types of continuous gambling, gaming machines have been the most extensively studied (Griffiths, 1998a). Not only do they provide high continuity (frequent replay), they also incorporate a number of related features that are associated with problem gambling. These features include rapid, arousing spans of play, frequent wins on a random and variable schedule, physical interaction, and light and sound effects (Griffiths, 1995).

The various other structural and contextual differences between the major types of gambling have been less thoroughly explored than the skill-luck and event frequency dimensions. However, some of them may be particularly important in explaining the appeal of different types of gambling as well as various aspects of gambling behaviour, including problem gambling. The intellectual and physical appeal of different games, for example, is a dimension that might be usefully examined.

Future research should enable the various gambling characteristics referred to above to be more clearly delineated and weighted in terms of their capacity to predict outcomes of theoretical and/or

practical significance. It may then be possible, for each type of gambling, to construct a multidimensional profile of the more salient of these characteristics. This would provide a finer-grained classification framework for gambling subtypes than is currently provided by the continuous-discontinuous and skill-luck continua. Volberg and Banks (1994) made a contribution to this objective by using factor analysis to classify gambling activities. They obtained three factorial groupings, described by the authors as games of luck, skill and leisure. Incidentally, of the three, only games of skill (betting, dice and card games) were found to be strongly associated with problem gambling. However, their cross-sectional design did not allow causation to be inferred and studies using other methodologies are required to advance this line of investigation.

Another approach to developing a classificatory model for gambling activities was provided by Solonsch (1991) who was interested in segmenting the market for commercial reasons. Solonsch combined the event frequency dimension referred to above with a second dimension that appears to incorporate the skill-luck continuum along with a variety of other, probably related attributes. This second scale is labelled 'level of involvement' and refers to the degree of physical, mental and/or emotional involvement related to each type of gambling. It is a complex dimension that incorporates many of the more specific factors listed above including psychological reactions to them.

Solonsch's model was refined by New Zealand Department of Internal Affairs research staff and used to classify all major forms of gambling available in New Zealand in 1995 (Department of Internal Affairs, 1995d). Each type of gambling was rated by a panel of experts and located on the two dimensions. Those in the high involvement-short time quadrant included casino table games, cards, race betting, housie and gaming machines. These activities were considered more likely than others to be associated with problem gambling and other social costs. It was suggested that proposals to introduce new forms of gambling of this type should be given closer scrutiny than other types and that these types of gambling could be differentially levied to provide funding for the treatment of problem gamblers and education. Activities in the low involvement-long time quadrant included lotteries/raffles, Lotto, the Melbourne Cup sweepstake and Daily Keno. Activities in the short time-low involvement quadrant included Instant Kiwi, casino keno and 0900 games. Those in the long time-high involvement quadrant included special doubles, Pick Six and casino evenings. The authors emphasise that this model is tentative and requires further work to refine and validate it.

With the rapid evolution of legal gambling, many traditional assumptions about gambling, including its categorisation, appear to be losing their salience. One example is the distinction often made in the 1980s, and referred to above, between 'soft' forms of gaming (e.g. lotteries) and 'hard' forms of gambling (e.g. casino-style games and electronic gaming machines). The boundary between 'soft' and 'hard' has become blurred as lotteries offer electronic games such as video poker and video keno, as racetracks add slot machine and card club operations, and as casinos market their products as "family entertainment." Themes for scratch games (instant lotteries) to be introduced this year in the United States include sports and casino gambling motifs such as baseball, bingo, blackjack and roulette.

Every type of legal gambling now offers faster cycling games with increasing levels of play. Future technological developments are expected to accentuate these trends (Griffiths, 1998b). These changes, including the convergence of previously more clearly differentiated forms of gambling, mean that it will be increasingly important to focus on characteristics within gambling 'types' rather than assume that each type is distinct.

A recent effort in the United States to assess gambling participation in the adult population illustrates the difficulties now involved in applying existing categories and distinctions to rapidly developing gambling markets. The division that has been made in state-level surveys of gambling between pari-mutuel, casino and lottery games is not as useful in classifying the availability of gambling for the entire United States. After lengthy discussion, a classification system was developed that distinguished among different types of gambling on the basis of whether venues offered single or multiple activities and whether they offered one major activity or a variety of types of gambling (Volberg, personal communication). As legal gambling continues to evolve, it is likely that this and other systems for classifying gaming products and venues will be developed.

2.4 Historical Overview

Origins

Gambling is an ancient form of recreation. There is archaeological and historical evidence of gambling in many ancient civilisations including those of the Egyptians, Chinese, Japanese, Hindus, Persians, Hebrews and Huns. Gambling has also been widely documented in prehistoric cultures as well as among indigenous tribal peoples (Gabriel, 1996). From these accounts it is likely that gambling emerged independently in a number of different societies. In addition, gambling innovations and practices have been widely transported across geographical and cultural boundaries.

Gambling has often played a significant role within societies although, historically, attitudes about its acceptability have fluctuated in different eras and cultures. Many countries appear to have gone through a series of alternating, long-term cycles of liberalisation and restriction. Carpenter (1988) provides an interesting account of state regulation of gambling in Thirteenth Century Spain. The purpose of this regulation was to ensure that the Crown received a portion of revenue and to reduce disruption of the social order.

Europe

The first lotteries for prizes probably took place in Italy in the Middle Ages and were brought to France and England in the mid-1500s (Clotfelter & Cook, 1989). In revolutionary France, the glittering Palais Royal served as a tourist centre with shops and cafes as well as over 100 illicit gambling operations featuring dice and card games. Although the five main clubs were legalised by Napoleon in 1806, anti-gambling forces were able to compel the clubs to close in 1837. The Napoleonic laws legalising casino gambling formed the basis for legal gambling casinos today in France (Barnhart, 1992). France was the first European country to reintroduce casinos at spas and resorts at the beginning of the Twentieth Century.

Gambling appears to have been widespread throughout Europe and Asia in the Middle Ages. In England, by the Sixteenth Century, gambling was commonplace through all social strata. Both men and women participated. Although tolerated amongst the aristocracy and upper classes, legal measures were introduced during the early part of the Seventeenth Century to curb gambling excesses in the lower classes. Legislation was passed making gambling illegal for commoners except at Christmas time. There appears to have been a reduction in gambling activity during the middle part of that century. However, by the start of the Eighteenth Century, gambling had expanded again. Gambling clubs and houses proliferated. George II established the first national lottery. Betting on horse races and most other sporting events became popular.

The rise of the Protestant work ethic during the early part of the Nineteenth Century was associated with a further period of gambling restriction throughout much of Europe. In England, casinos were closed, betting laws introduced and the state lottery was abolished in 1826. Bear-baiting and rat-, dog- and cock-fighting were prohibited. However, the new laws were enforced in a discriminatory manner. Upper class gambling continued to be condoned and flourished. Working class gambling went underground (Grant, 1994).

Spread to the Colonies

The gambling practices and attitudes that prevailed in England and other parts of Europe were transplanted to the emerging colonial societies in the Americas, Australia, New Zealand and other parts of the world. Gambling played an important role in these frontier societies that lacked established leisure infrastructures. In Australia and New Zealand the colonial gentry rapidly adopted racing and the card and dice games popular in British rural society. Additionally, for this group, gambling in private clubs was popular. For the lower classes, gambling and betting were also widespread. Although the attitudes and activities of these socioeconomic groups differed, they were generally agreed that gambling and betting were legitimate pursuits that should be allowed to prosper (Grant, 1994; O'Hara, 1987).

North America

In North America, the colonies were financed in large part by public lotteries. Many prominent individuals, including George Washington and Thomas Jefferson, sponsored private lotteries to raise money for combat or for personal expenses (Rose, 1986). In contrast to Australia and New Zealand, the history of gambling in North America appears to have been more strongly influenced by longstanding ambivalence as successive waves of leniency towards gambling alternated with repression of these activities (Findlay, 1986). In the early Nineteenth Century, the risky and transient society of river towns and steamboats in the lower Mississippi River Valley fostered the emergence of professional gamblers and new casino games characterised by speed and portability. At the same time, these games, especially card and dice games, began to spread to other parts of North America.

In the mid-Nineteenth Century, as newly settled areas sought to emulate more settled and respectable communities in the East, professional gamblers were persecuted throughout the Southwest. In the same period, casino gambling flourished on the mining frontier in California and the newly popular games were introduced to syndicates in Eastern cities (Findlay, 1986). It was not until the end of the Nineteenth Century, with the collapse of the Louisiana Lottery, that casino games and lotteries were outlawed throughout the United States (Rose, 1986). Legal gambling opportunities were extremely limited in almost all parts of the United States and Canada during most of the current century.

Australia

Gambling restrictions were also applied in Australia and New Zealand during the latter part of the Nineteenth and early Twentieth Centuries, although they were less comprehensive than in the United States and Canada. This was particularly the case in Australia. McMillen (1996b), notes "in contrast to the prohibitive regimes in Britain and the United States, Australian governments adopted a markedly liberal approach to the legislation of gambling" (p.12). Although Australia permitted a wider variety of legal gambling activities throughout the Twentieth Century than most if not all other developed countries, government played a direct role in its development and control (O'Hara, 1988; McMillen, 1996a). This control has been exercised primarily at the state government level. As a consequence, there was and continues to be some variation between states. However, most state policies during the 1960s could be described as liberal, with government ownership of lotteries and the TAB and regulation of the private sector that was involved in club gambling and bookmaking.

During the 1970s, further liberalisation occurred with Tasmania and the Northern Territory legalising privately operated casinos. Additional casinos were established in Queensland, Western Australia and South Australia during the 1980s. These developments preceded the more general wave of gambling liberalisation that occurred throughout most developed countries during the late 1980s and 1990s. During this latter period, further casinos were built in the remaining states of New South Wales and Victoria, along with nation-wide expansion of gaming machines and various other forms of gambling. In contrast to most other parts of the world, Australia's 14 casinos are distinctive in that all are located in urban centres, have a regional monopoly and generally rely heavily on local patronage. The majority of Australian casinos, especially those built since 1980, are large, egalitarian, urban complexes, readily accessible to all sectors of society. They contrast with the smaller 'up market' British and European casinos and their United States counterparts that until recently have been located away from major population centres.

New Zealand

There appears to be no evidence of gambling in pre-European Mäori society. Gambling was first introduced by sealers and whalers in the early nineteenth century. From its colonisation in 1840, gambling flourished in New Zealand, as it did in the earlier frontier settlement in North America and Australia. The first thoroughbred horse was imported in 1840 and race meetings and bets were recorded during the 1840s (Grant, 1994). Historically, New Zealand has had a somewhat less liberal approach to gambling than Australia. New Zealand's first significant gambling legislation, passed in 1881, was

titled 'An Act for the suppression of Gaming and Betting Houses, and the more effectual abolition of Lotteries'. Apart from betting on horse and dog races through on-course totalisators and through bookmakers, almost all other forms of gambling were made illegal. However, this legislation was variably enforced.

The second major piece of New Zealand gambling legislation was the 1908 Gaming Act. These early legislative initiatives included provision for works of art, literature, mineral or agricultural specimens and mechanical models to be disposed of by lot with the permission of the Secretary for Internal Affairs. Registered 'Art Unions' were also permitted to raffle works of art. O'Sullivan and Christoffel (1992) and Grant (1994) outline how this legislation was manipulated, with the collusion of government, to allow a variety of voluntary sector organisations to run lotteries. This included the government, which established its own Art Union (state lottery) in 1929. Art Union lotteries were initially paid in alluvial gold (a mineral specimen), thus meeting the requirement of the 1908 Act. Later, monetary prizes were paid, although use of the term 'Art Union' was retained and prizes continued to be advertised as 'alluvial gold', to give the impression that they were lawful. Although technically illegal until 1949, lotteries have been popular throughout the country from the late 1920s.

From the 1930s legal restrictions were gradually lifted in New Zealand. Card playing to raise money for charities was legalised in 1933 and in 1949 voluntary organisations were allowed to run raffles and prize competitions to raise funds. The TAB was established in 1951 to limit bookmaking by enabling off-course betting on track races. Housie was permitted from 1959 to obtain funds for specified charitable purposes. O'Sullivan and Christoffel (1992) observe that government's emphasis shifted over time from attempting to ban most forms of gambling to ensuring that revenue went to non-profit-making organisations. This is reflected in the full title of the Gaming and Lotteries Act 1977, namely an Act "to make better provision for the conduct of games of chance, prize competitions, and lotteries for amusement and for raising funds for certain purposes while continuing to prohibit the conduct of such activities for commercial gain."

The emphasis of the 1977 legislation on directing gambling profits continued during the late 1980s when three additional activities were introduced, namely Lotto (a national televised lottery), Instant Kiwi (an instant lottery) and gaming machines. This policy emphasis changed somewhat with the Casino Control Act 1990, which provided a framework for the establishment of casinos. The Act permitted private gain and regarded casinos as a means to stimulate economic and regional development. A similar shift had occurred earlier in most Australian states.

2.5 Sociocultural Considerations

While gambling activities can be defined and considered to be discrete phenomena for the purpose of making comparisons over time or between different groups, like other human behaviours they take place within particular social and cultural contexts. As a consequence, activities that appear to be similar may have varied meanings and consequences in different cultural or historical settings. While most human cultures have some tradition of gambling, some apparently do not. For example, a number of Pacific Island languages do not have a word for gambling. Prior to European contact, there are no accounts of gambling, as it is defined in this review, in these Pacific societies. This was also apparently the case for New Zealand Mäori and the Australian pre-European contact indigenous population (DIA, 1995d; Foote, 1996a; Grant, 1994).

These varied degrees of experience with and diversity of ways of categorising gambling are important matters in their own right that have been little investigated by social anthropologists or other social scientists. A notable exception here is the classic paper by Geertz (1973) on cock fighting in a Balinese village. These differences in sociocultural context and meaning are also important to consider in relation to gambling within contemporary, complex, post-industrial societies.

Most societies contain a diversity of ethnic groups. Some, including New Zealand, have significant indigenous populations. Migration is also occurring on a historically unprecedented scale and has

important implications for physical and mental health (Abbott, 1997a). It has been argued that migration is currently the worldwide 'visible face of social change' (UN Population Fund, 1993) and that we are in the early years of 'the age of migration' (Castles & Miller, 1993). Most parts of Europe, the United States, Canada, Australia and New Zealand all have large foreign-born populations. New Zealand and Australia are notable in that approximately a fifth of their respective populations are in this category. A comprehensive account of gambling and problem gambling in these countries necessitates consideration of ethnic differences.

Gambling behaviour and attitudes have also been shown to vary between men and women, religious groups, age categories and occupational and socioeconomic strata (Abbott & Volberg, 1991; 1992). To varying degrees, these groupings may be regarded as separate subcultures. As with ethnicity, they are important dimensions to consider. Many of the measures that have been developed to assess aspects of gambling, including problem gambling, have not been adequately validated within these various groups. More generally, it cannot be assumed that findings from research with samples drawn from one group will apply to others.

2.6 International Context: Overview

This section considers the present organisation of major forms of commercial gambling in Europe, North America, Australia and New Zealand. As already mentioned, there is relatively little easily accessed information about changes in participation in gambling over time. Most of the relevant information that has been gathered exists as aggregate expenditure data and market surveys conducted by gambling operators and selectively disseminated. Consequently, much of this section relies on industry sources and trade magazine reports. Since so many recent trends are common to commercial gambling markets internationally, we present this information by industry rather than by country.

Lotteries

In the 1970s and 1980s many governments internationally moved to legalise different types of gambling, including lotteries. In North America, lotteries now operate in 37 states and the District of Columbia as well as in all of the Canadian provinces. Australia and New Zealand have had lotteries throughout the present century. However, they have expanded during the past decade. The top ten countries in lottery sales per capita in 1997 included the United States, Spain, Italy, Germany, United Kingdom, Japan, France, Canada, Malaysia and Australia (McQueen, 1998). In a number of these countries, lotto and/or other lotteries are in the top three forms of gambling when ranked according to percentage of total gambling expenditure (Becoña, 1996).

As lotteries have matured, they have introduced new, more exciting products to maintain and increase sales. Lottery organisations in many jurisdictions now offer a multitude of games that blur the boundaries between their traditional products and other types of gambling, including instant or scratch tickets, daily numbers games, and electronic gaming devices offering keno, poker, blackjack and line games similar to slot machines at casinos. Recently casino games have been included among the "themes" offered on scratch lotteries. Except for the United States, where sports betting is largely illegal, sports lottery games further blur the boundary between lotteries and legal bookmaking and pari-mutuel operations. Finally, there is the growing availability of lottery games on the Internet, including the Red Cross lottery based in Liechtenstein, the national lottery in Finland, and the lottery offered by the Coeur d'Alene tribe in Idaho (McQueen, 1997; McQueen, Rzadzki, Keyes & Jones, 1998).

Casino-Style Gambling

Casino industries are now firmly established in Australia, Europe, and North America. On all three continents, the modern casino era started as a tourist-based industry. Since 1990, however,

casinos have grown increasingly dependent on local players for casino profits. True city-centered casinos, serving a predominantly local clientele, were first established in some Canadian provinces and Australia. There are now city-centered casinos in five of the eleven Canadian provinces. In Australia, the first casinos were located in smaller cities and resort locations. Today, all of Australia's major cities have casinos that serve predominantly local markets. New Zealand's two casinos, in its largest metropolitan centres (Auckland and Christchurch), are also in this category. Applications to construct a further four casinos (two in cities; two in resort centres) have been made to the Casino Control Authority. Three of the four have recently been licenced. The New Zealand government has placed a moratorium on other applications until October 2000.

In France, casinos were once operated seasonally and only for tourists. In the 1990s, French casinos were established in permanent facilities and locals were allowed to play. It is likely that casinos will soon be permitted in several major French urban centres, including Lyon, Bordeaux and possibly Paris. Elsewhere in Europe, the Dutch have introduced casinos in Amsterdam and Rotterdam. There is also a casino in Copenhagen. In Germany, there are casinos in Stuttgart, Hamburg and Berlin. In Spain, laws against casinos in city centres have been overturned and Seville and Barcelona are expected to have urban casinos in the near future. In Great Britain, small casinos have been located in city centres since they were first legalised in 1970. Now, however, laws that prevent advertising and require membership registration are changing (Kent-Lemon, 1998). In European countries with the highest per capita gambling expenditure, including Spain, France and Great Britain, casino gambling is ranked from four to six in order of popularity (as measured by percentage of total gambling expenditure).

While casino-style gambling spread rapidly across the United States in the 1990s, the trend toward urban casinos has been slower than in parts of Europe, Australia and New Zealand. In the Twentieth Century, casino-style gambling outside Nevada and Atlantic City first came to several small mining towns in Colorado and South Dakota. These casinos offered limited-stakes table games such as poker and blackjack as well as slot machines. Tax revenues were initially earmarked for historical preservation. In South Dakota, limited-stakes casino gambling has been so successful that a substantial proportion of tax revenues now goes into the general fund.

The Indian Gaming Regulatory Act of 1988 created a regulatory structure for gambling on Native American lands throughout the United States. By establishing a framework for negotiation between the sovereign tribes and state governments, Congress opened the way for American Indian tribes to establish casino-style gambling in any state where charitable or social gambling is permitted (Eadington, 1991). There are now 24 states that have entered into compacts with 146 tribes to establish a variety of gambling operations throughout the United States (Bureau of Indian Affairs, 1998).

This development and the South Dakota and Colorado initiatives served as a catalyst for a proliferation of casino-style gambling throughout the United States. The first riverboat casinos, legalised in Iowa in 1991, placed strict limits on both wagers and losses. As riverboat casinos were legalised in other states, including Illinios, Indiana, Louisiana, Mississippi and Missouri, these limits were lifted. While this type of casino must be located on facilities that look like boats, few of the riverboats actually leave shore. In Mississippi and Missouri, as well as in Iowa where the earlier restrictions have been eliminated, the term "dockside gambling" or "boats in moats" is a more accurate description than "riverboat gambling."

Recent gains in casino turnover and revenue have been considerable. Handle and win more than quadrupled between 1982 and 1996 (IGWB Online, August 1997) with revenue more than doubling between 1991 and 1995 alone (The Promus Companies, 1996). Industry data on casino penetration among United States households indicate that 17 percent of households visited casinos in 1990; this rose to 31 percent in 1995 (The Promus Companies, 1996). Furthermore, the average number of trips per household has steadily increased from 2.7 in 1990 to 4.7 in 1995. Most of this growth took place in the South and North Central states where riverboat and dockside gambling is now well established.

In contrast to the United States, Australia and New Zealand, where casinos tend to be privately owned and operated, the Canadian provinces have implemented casino gambling as a means to raise funds for charitable purposes. There are now casinos in half of the Canadian provinces. Provincial governments operate most of the Canadian casinos with the proceeds distributed to charitable organisations. Manitoba opened the first high-stakes casino in Canada in 1990. This facility is operated by the Manitoba Lottery Corporation and offers traditional casino table games as well as slot machines.

In 1993, the provincial lottery in Quebec opened a casino offering table games and slot machines. There are now three casinos operating in the province. In 1994, Ontario licensed its first casino in Windsor, directly across the river from Detroit, a major United States metropolitan market. Two more casinos have opened in Ontario since then. Unlike the other Canadian provinces, the Ontario casinos are operated by private consortia rather than by provincial agencies (Campbell, 1994). Since 1995, casinos have opened in Saskatchewan and Nova Scotia and consideration has been given several times to establishing a city centre casino in British Columbia.

Gaming Machines

After the emergence of urban casinos, the trend with the greatest effect on gambling markets worldwide is the growing popularity and availability of electronic gaming machines. This trend is evident both outside and within casinos. Electronic gaming devices include traditional slot machines as well as government or privately owned machines that feature video poker, video blackjack, video keno and traditional line games. In mature casino markets, table games are in decline vis-a-vis slot machines. In every country where statistics are available, including New Zealand, slot machines have increased their market share and table game revenues are declining. In France, 87 percent of casino revenues are derived from slots. In the United States, total gaming machine revenues represent between 65 percent and 80 percent of total gaming revenues in different casino markets (Kent-Lemon, 1998; Palermo, 1999).

In addition to slot machines in casinos, electronic gaming devices are an established element in the mature gambling markets of Australasia, Europe, and North America. In Australia and New Zealand, many thousands of “pokies” and slot machines are permitted at social clubs (Breen, Hing & Weeks, 1997). They are also commonplace in pubs and taverns. In the United States during 1997 machines outside casinos accounted for approximately 26 percent of total legal gambling turnover and 23 percent of net expenditure. Corresponding figures for Australia were approximately 62 percent and 49 percent (Tasmanian Gaming Commission, 1998). In New Zealand 1997 net expenditure for machines was 23 percent, identical to the figure for the United States.

In Europe, in countries as diverse as Germany, Great Britain, the Netherlands, and Spain, there are tens of thousands of AWP (amusement with prizes) machines as well as true slot machines placed in bars, taverns, restaurants and arcades (Becoña, 1996; Brown & Fisher, 1996; Remmers, 1997). For example, in Germany in 1991, there were 174,000 slot machines in game rooms and other public places (Buhringer & Konstanty, 1992). At that time Spain had approximately 450,000 (Becoña, 1993). In these four countries, gaming machines are ranked in the top three categories of gambling in terms of percentage of total national gambling expenditure.

There are now twenty-four states and seven provinces in North America where electronic gambling devices such as slot machines or video lottery terminals are widely available (McQueen, 1997). In Canada, New Brunswick was the first province to introduce video lottery terminals in 1990. In 1991, three other provinces served by the Atlantic Lottery Corporation also introduced these machines (Campbell, 1994). Electronic gaming machines are also well established in Quebec and Alberta.

Charitable Gambling

Despite widespread prohibitions against gambling throughout most of the Twentieth Century, gambling for charitable purposes has a long history internationally. Indeed, bingo and casino nights run for or by charities and churches are often not even regarded as gambling. As with lotteries and casinos, however, charitable gambling in the 1980s and 1990s has evolved to include larger facilities, higher stakes and faster games. Large-scale bingo halls, seating hundreds of players, are found in many provinces and states throughout North America. In the United States, American Indian tribes run many of these large-scale bingo operations. Electronic linking of bingo games in separate locales has meant that the prizes for some of these games can be extremely large. Finally, there is the development of electronic bingo that allows operators to sell far more cards per game to their players and, in some cases, to increase the speed of the game appreciably. Electronic bingo has proved especially popular in South American countries where casinos are still largely illegal (Handler & McQueen, 1998). Although charitable gambling revenues have increased in the United States, they have dropped in relative terms. In 1982 11 percent of total gambling revenue accrued to charities. In 1995 this had dropped to six percent.

Charitable gambling has been legal in Australia and New Zealand throughout the twentieth century. Raffles, lotteries and housie (bingo) have been and remain popular. Gaming machines have been permitted in voluntary sector clubs in some Australian states, notably New South Wales, for over 30 years. In New Zealand, the large majority of gambling revenue from all forms other than racing and casinos is directed to community organisations. This is also the case in Australia although a significant amount goes directly to state government consolidated revenues. Approximately ten percent of total state government revenue comes from gambling sources in Australia (Productivity Commission, 1998).

Track Betting

In contrast to lotteries and casinos, the pari-mutuel industry has struggled to compete in a vastly more competitive environment in recent years. Between 1982 and 1995, revenue derived from horse and dog racing fell from 26 percent to eight percent of total United States gambling revenue. In North America, racetracks have sought relief from taxation and have also sought to expand their activities. Initially, racetracks worked to increase access to their traditional product by establishing off-track betting systems. More recently, racetracks have sought to compete by offering other types of gambling. In California, several racetracks now have card rooms where patrons may wager on poker and other games. In Delaware, Iowa and West Virginia, racetracks have been permitted to add electronic gambling machines to their traditional products with excellent results for their bottom line.

Although popular in the Great Britain and to some extent Germany and a few other European countries, track betting is relatively less popular throughout most of Europe than in North America and a number of other countries that were previously British colonies, e.g. Australia, New Zealand and Hong Kong.

Betting on horse racing has been legal in Australia and New Zealand since the very beginning of European colonisation. More recently, legal betting on other sporting events has been introduced. New Zealand also has a national television channel dedicated to track betting. In New Zealand, during 1997, betting on horse and dog races accounted for approximately 17 percent of total gambling turnover and 22 percent of net expenditure. Corresponding figures for Australia in that year were 14 percent and 16 percent. In both countries this represents a decrease over time both in absolute inflation-adjusted terms and relative to other major forms of gambling. However, the decline has not been as great as in North America.

2.7 Emerging Trends and Technologies

There are several emerging, inter-related trends that will influence the evolution of commercial gambling internationally during at least the first decade of the next century. These include the growing legitimacy of legal gambling, the intersection of electronic technologies used in financial markets and gaming venues, the looming impacts of the Internet on all forms of gambling, accelerating globalisation and the spread of gambling to non-gambling settings.

Changing Attitudes Towards Gambling

George Washington wrote to a nephew in 1783, "Gambling - the child of avarice, the brother of iniquity and the father of mischief" (Spinrad & Spinrad, 1979). This statement reflected widely held views of the day that gambling was morally wrong and carried with it a variety of personal and social ills. However, considering that Washington allegedly founded one of the first state lotteries in the United States, it also illustrates a double standard toward gambling that has a lengthy heritage. Gambling activities among the upper classes, whether on horses, cards, casino games, real estate or stocks, have long been condoned in most Western societies. Despite the efforts of reformers, similar activities have been broadly tolerated among the working and lower classes. In contrast, until the latter part of the Twentieth Century, gambling among the middle classes in most countries has been disapproved of (Rosecrance, 1988). It is likely that the growth of the middle classes, which was also associated with urbanisation and the enfranchisement of women, played a significant part in the late Nineteenth-early Twentieth Century prohibition movement that focused on curbing the excesses of both alcohol and gambling (Phillips, 1987; Grant, 1994).

There can be little doubt that the last two decades of the Twentieth Century have been marked by substantial increases in the availability and acceptability of commercial gambling. Researchers have suggested that legalisation itself, as well as needs for government revenue, have stimulated gambling participation (McMillen, 1996b). Others cite economic factors such as the rise in discretionary income and differential tax regulations that encourage the establishment of gambling enterprises. Increased secularisation of society and more liberal stances on gambling by many religions and mainstream denominations probably also played a part. No doubt these and many other factors have contributed to the current wave of gambling expansion. However, given the size and influence of the middle classes, growing acceptance of gambling by this socioeconomic group has undoubtedly been a particularly salient factor in the legitimation of gambling worldwide (Rosecrance, 1988).

Conceivably, the 'medicalisation' of problem gambling may also have played a role in facilitating increased acceptability of gambling – by fostering the belief that it can be addressed by mental health professionals. Social scientists and social historians have probably also played a role in the normalisation of gambling. Austrin (1998) notes that in their accounts of popular culture, sociologists and anthropologists "…celebrated gambling as a practice at a time when it was actually stigmatised by government policies" (p.168).

The body of academic literature referred to by Austrin included studies that focused on psychological and social pleasures associated with gambling or examined the role of gambling in affirming individual or community identity. Examples cited by Austrin include Geertz (1973), referred to in Section One, who suggested that gambling on cock fighting represented a vital expression of Balinese male identity. Austrin also refers to studies by Dixey (1987) on bingo clubs in Great Britain, Lynch (1992) on poker machines in New South Wales clubs and Rosecrance (1987) on track betting. These writers argue that each of these forms of gambling play a role in sustaining community identity and providing social support networks. The broad body of economic (and to some extent social) research that focuses on benefits associated with gambling has probably also played a role in helping to legitimatise gambling.

There are numerous ways that legal gambling now reaches into many cultures and societies and

increases the legitimacy of these activities. When gambling is legalised, the operation and oversight of gambling activities become part of the routine processes of government. Gambling commissions are established, gambling revenues are distributed, constituencies of customers, workers and organisations develop. Governments become dependent on revenues from legal gambling to fund essential services. So too, to varying degrees, do churches, voluntary organisations, the mass media and, more recently, researchers and gambling treatment providers - sectors that traditionally served as critics and consciences for society. Many non-gambling occupations and businesses also become dependent on legal gambling. Lawyers, accountants, architects, public relations and advertising, security services and financial services expand their activities to provide for the gambling industry. Convenience stores, retail operators, restaurants, hotels and social clubs become dependent on revenues from legal gambling to continue to operate profitably.

Although there has been growing public acceptance of gambling and increased participation across all sectors of society, as indicated in Section One, during the last few years there has also been an increase in awareness of and concern about problem gambling and associated social costs, both real and perceived. Social science research on problem gambling and other social costs associated with some forms of gambling has probably contributed to this concern (Abbott, 1992; 1994b; Volberg et al, 1996). This has been associated with a growing protest movement, particularly focused on preventing the further expansion of gaming machines and casinos.

In some countries, including the United States, measures have been taken to control access to Internet gambling, although this may be driven more by a concern about potential declines in tax revenue than about problem gambling. While public acceptance and normalisation appear to prevail in most parts of the world (many Islamic countries retain strong prohibitions against gambling), it remains to be seen what influence the growing anti-gambling movement will have in the future. If history is a guide, there could well be a further cycle of constriction ten or twenty years from now. However, it is equally possible that the changes that are currently occurring in commercial gambling are qualitatively different from what has gone before and are enmeshed within globalisation forces that will evade conventional social and legislative control mechanisms.

The Intersection of Gambling and Financial Technologies

Electronic technologies, while not highly visible, are already having a profound effect on the conduct of commercial gambling internationally. The intersection of financial institutions and legal gambling is leading to developments such as “cashless” gambling, in which wagering on casino games as well as the purchase of lottery tickets is done with credit or debit cards. Both the casino and lottery industries are spending considerable resources on technologies that improve management systems, allow player tracking, speed financial transactions and enhance the games themselves (Bivins & Hahnke, 1998). These developments have already fostered the growth of ‘point spread’ where people can bet on events over the phone, even while the events are actually taking place, using pre-arranged debit accounts or credit (Griffiths, 1998a).

There are other technologies available that will permit “at home gambling,” in which cable television will bring satellite wagering into the home and interactive communication will be used to stop sports action and place wagers in real time. However, significant development is probably needed before consumers are likely to be entirely comfortable with these initiatives.

Internet Gambling

On the horizon is the prospect of a vast array of sports wagering, casino gambling and lottery games on the Internet. Just a few years ago, hardly a single wager was placed online. Today, there are approximately 300 sites where anyone with a computer, a modem and access to the Internet can wager on blackjack, slot machines, bingo, keno, craps, horse and dog races, sports events and lotteries. Internet gambling is particularly appealing to a new group of gamblers – youth and young adults who are computer literate and can take advantage of the fact that age

restrictions are difficult to enforce in cyberspace (Griffiths, 1998b).

The potential market for Internet gambling is enormous. According to one analyst, the number of sites offering wagers on casino games had grown from 10 in 1996 to 40 in 1997. Online wagering internationally could reach US$8 billion annually by the turn of the century if these operations were made legal. There are two major issues that could affect the projected growth of Internet gambling. These include concerns among users about the security of sending financial information over the network and pending legislation in the United States Congress that would criminalise Internet wagering in one of the largest potential markets for at-home casino games (Sinclair, 1997; 1998).

These issues are now being addressed internationally. As Internet users become more comfortable with encryption technology that secures financial transactions, it is likely that Internet gambling will increase. Further, in contrast to the United States, a number of governments internationally are taking steps to regulate and license Internet gambling operations. The governments of Finland and Liechtenstein have established state-regulated lotteries available on the Internet (McQueen, 1997).

In May 1997, the eight Australian states and territories agreed to the Draft Regulatory Control Model for New Forms of Interactive Home Gambling.

Queensland passed the Interactive Gambling (Player Protection) Act 1998, in accordance with the Draft Model, and granted the first licence on 3 June 1999 to Gocorp Ltd. (Queensland Office of Gaming Regulation,1999).

Victoria passed the Interactive Gaming (Player Protection) Act 1999 on 8 June in accordance with the Draft Model. Most of its provisions do not yet have a commencement date.

Northern Territory passed legislation permitting Internet-based gambling early in 1998, which is not in accordance with the Draft Model. Lasseters (Alice Springs) went on line in April 1999 (www.lasseters.com.au, 25 May 1999).

In the Australian Capital Territory (ACT) the Interactive Gambling Bill 1998 is still before the House. ACT has granted a licence to American Wagering Inc. for an Internet sports betting site that began taking bets from Canberra in March 1999 (Hepworth,1999).

Globalisation

The developments mentioned above can also be viewed as part of inter-related globalisation processes that have gathered momentum since the early 1980s and now constitute the major force in economic and social change world-wide. Other aspects of globalisation include international financial markets, transnational corporations, transnational technology, international nongovernmental organisations and an emerging global cultural homogenisation. McMillen (1996b) concluded that the implications of globalisation for gambling are as follows:

> The shift in gambling development from local-national to international levels has resulted in a shift in power to the global or supranational level. It has also shifted policy emphasis from social to economic imperatives. Gambling is no longer a social activity shaped primarily by community needs and values. Gambling has become big business, reclassified as part of the entertainment sector and integrated into mainstream economic development. What was once a cultural and social expression characterised by diversity and localised control is now a highly competitive global industry (p.11).

Austrin (1998) examines ways in which globalisation forces have given rise to experimentation with organisational innovations within national gambling markets. Like McMillen he maintains that one aspect of this innovation is the development of “a new rhetoric which combines gambling as

popular leisure with gambling as a tool for economic development" (p.168). In the case of New Zealand, he anticipates that these changes will lead to a major reorganisation of the gambling industry and illustrates how traditional divisions between track betting, lotteries, gaming machines and casinos are already starting to break down.

Gambling in Non-gambling Settings

One of the more notable changes in recent years has been the shift of gambling from gambling-specific venues to a much wider range of social settings. In addition, in many countries, multiple forms of gambling are now available in venues such as pubs that previously offered a more limited range of activities. In effect, some have become mini-casinos and sometimes are promoted as such. These types of development have been referred to by Goodman as the growth of "convenience gambling" (Goodman, 1995).

Commenting on developments in the United Kingdom, Griffiths (1998a) noted that prior to the recent introduction of the National Lottery, legal gambling was largely confined to bingo halls, betting shops, casinos and amusement arcades. Currently, he observes:

> gambling can now be done in a wide variety of retail outlets. A person cannot walk 100 yards down any town or city high street without seeing Camelot's blue "crossed fingers" logo. One study found that this was the most recognised logo amongst children with 90% of children between 8- and 12-years of age recalling it. It is also clear that the "newer" forms of gambling like internet gambling and spread betting are activities that are done almost exclusively from non-gambling environments (usually the home or workplace) (p.4).

It would appear from Griffith's account that everyday reality is no longer consistent with the United Kingdom's official policy of "unstimulated demand". Similar descriptions could be given from other countries.

In New Zealand, many forms of gambling including gaming machines are readily available in premises licensed to sell alcohol. These licences have been liberalised in recent years, thus extending the locations and times when gambling is available. Accessibility will be further extended if the age for drinking in licensed premises is lowered.

The consequences, both short- and long-term, of this increased permeation of gambling throughout society have yet to be examined. However, it is likely that children and adolescents will observe and engage in gambling activities at younger ages than was the case when gambling was predominantly localised in age segregated premises. To adequately understand the multiplicity of changes that may flow from these new gambling developments, it will be necessary to significantly widen the scope of investigation and methodologies used.

Regulating a Moving Target

Rapid changes in legal gambling, including technological change and intense competitive pressures, have blurred the lines between gambling activities and have made them difficult to regulate. The primary legislative and regulatory response, to attempt to provide a "level playing field" for all the sectors of the gambling industry, has generally been adopted on behalf of the least successful sectors of the gambling industry (i.e. charitable gambling and pari-mutuel wagering) (Rose, 1999).

Examples of providing a level playing field include tax relief provisions for racetracks as well as the expansion of pari-mutuel wagering in many jurisdictions to include off-track and telephone betting and the introduction of slot machines and card rooms at racetracks. In response to the rapid expansion of casino-style gambling on American Indian reservations, charitable gambling operations in many states have been permitted to conduct linked, progressive bingo games and licensed card rooms have been allowed to conduct "house banked" games.

Another difficulty in regulating legal gambling is that many of the laws that presently govern lottery, pari-mutuel and casino gambling were promulgated in the early part of the Twentieth Century. For example, some elements of the United States Wire Communications Act were originally written to prevent the transmission of horse racing information by telegraph from one state to another. However, the Wire Communications Act is wholly inadequate to deal with Internet gambling.

There are further issues to consider in relation to Internet gambling. In addition to the dangers of consumer fraud associated with the use of credit cards, there are jurisdictional issues – where is a bet placed in cyberspace? Is the activity legal in the jurisdiction where it was placed, in the jurisdiction where it was registered, in the jurisdiction where the funds are deposited? What happens in the United States and other countries that wish to limit access to Internet gambling when the Australian government licenses and regulates Internet gambling operators? What are the challenges for intergovernmental relations and foreign policy? What are the consequences of legislation in the United States, such as the Internet Gambling Prohibition Act of 1997, for legal gambling operators, for gamblers and for citizens?

2.8 Gambling Participation and Attitudes

As indicated, the major focus of Section Two of the review is on studies and surveys of gambling participation and attitudes towards gambling. Problem gambling is covered in Section Three. Definitions of gambling and different ways of classifying gambling types were addressed earlier. It was evident from this account that it is important to differentiate between gambling types when examining the relationship between 'gambling' and other variables or looking at changes over time. Similarly, attitudes towards each major type of gambling should be examined, rather than confining attention to attitudes towards gambling generally.

This section first looks at the way participation and attitudes are measured. Following that, detailed consideration is given to gambling participation and attitudinal surveys.

The Assessment of Participation and Attitudes

There are two broad approaches to the measurement of gambling participation. The first involves the use of aggregate data on gambling expenditure, from industry or government sources. Information at regional and/or national levels is often available on total turnover (handle) and net expenditure (total expenditure minus the sum returned as winnings) for some or all of the major types of legal gambling. This information is of variable and usually unknown accuracy. It does not usually include less popular forms of gambling or illegal gambling.

The second approach involves general population sample surveys. These studies typically ask people which types of gambling they participate in, how frequently they gamble and how much they spend on each type. Many problem gambling surveys also include a section that gathers this sort of participation information. Data collected this way are subject to errors of measurement including self-report and sampling. Industry or regulatory organisations have commissioned most of these surveys and many are not publicly released for commercial or other reasons. While the majority of surveys provide at least some useful information about overall population participation and expenditure, samples are rarely sufficiently large to allow accurate estimates to be made of different patterns of involvement among subgroups. However, in recent years, there has been an increase in surveys of particular sub-populations of interest, for example, youth.

A third category of investigation involves observation of gamblers' actual behaviour in real-life gambling settings or in simulated environments. Studies of this type are rarely considered here because the focus is on patterns of gambling behaviour and attitudes within total populations or large population segments.

A strength of aggregate expenditure data, when collection methods and definitions have remained constant, is that they enable changes over time to be examined. To make meaningful comparisons, however, it is necessary to adjust expenditure for purchasing power or inflation. In some countries, including New Zealand, participation surveys using similar methodologies have been repeated on a number of occasions, allowing changes over time to be tracked. However, while there have been repeat surveys, there remain a dearth of longitudinal studies where the same sample of people has been followed over time to examine shifts in their gambling participation in relation to changes in the availability of different forms of gambling, major life events or other factors.

Typically, aggregate expenditure data and survey findings provide broadly similar and complementary pictures of gambling participation. The former generally yields higher estimates of expenditure than the latter. Surveys, to date, have not clearly differentiated between turnover and net expenditure. There is reason to believe that individuals vary in their interpretation of questions, some providing estimates of their net expenditure and others estimating their turnover. Blaszczynski, Dumlao & Lange (1997) have shown how more considered wording of survey questions can increase consistency in this respect. It is also probable that the ratio of respondents estimating net expenditure versus turnover varies across gambling types. There may also be differences in this regard between sociodemographic groups.

Gambling participation and expenditure refer to aspects of what gamblers do - to aspects of gambling behaviour. Researchers, treatment practitioners, gambling industry executives and politicians, among others, are also interested in what people think and feel about gambling. In the present context we are concerned with attitudes towards gambling. Attitudes are a mix of cognition and emotion. Cognition refers to the capacity of humans to represent the world symbolically, primarily through language, and manipulate or structure these symbolic representations in thought, conversation and writing. Humans are also 'feeling' animals. Cognitive frameworks and everyday thinking are infused with a complex 'wash' of emotion. Attitudes are the relatively persistent combinations of categories and emotions that play an important role in human thinking, motivation and behaviour (Guilford, 1959).

At a somewhat simplistic level, attitudes can be divided into positive and negative and defined as a tendency to react favourably or unfavourably toward classes of stimuli. However, varying combinations of the full ambit of human emotions are involved. Not infrequently, attitudes incorporate conflicting sentiments. They can also be inconsistent with attitudes held about related matters. In these latter situations, ambivalence and apparently inconsistent behaviour may occur.

Attitudes cannot be directly observed. Attitudes towards gambling are assessed in various ways. Indirect methods include inferring attitudes from patterns of gambling participation, consideration of legislative changes or examination of the content of parliamentary transcripts, submissions to commissions, official inquiries or select committees and the mass media. More direct methods are used in surveys where questions and scales are designed specifically to assess participant attitudes. Published studies differ in the extent to which they draw on the large psychological technical literature on the measurement of attitudes (Hippler, Schwarz & Sudman, 1987; Schwarz & Sudman, 1996).

Although attitudes are of interest in their own right, scientists, as well as marketing professionals, politicians and indeed probably all sentient human beings, are particularly interested in attitudes because of their implications for the prediction of future behaviour. Everyday experience, as well as a vast body of literature across many disciplines, teaches us that while attitudes generally influence what people actually do, the relationship is at best partial (Festinger, 1957).

Surveys of Gambling Participation and Attitudes

This section focuses on the findings of surveys and other research on gambling participation and attitudes towards gambling. Emphasis is given to North American, Australian and New Zealand studies.

North America

Introduction

As already indicated, there has been substantial expansion of gambling throughout North America during the past 20 years, particularly during the present decade. At the time of publication of the first comprehensive national survey of gambling in the United States in 1976 only 13 states had lotteries, two had legal off-track betting and casinos were confined to Nevada (National Opinion Research Center, 1999a). Currently, gambling is legal in all states except Hawaii, Tennessee and Utah; 37 states have lotteries, 23 states have casinos and most have off-track betting. There are lotteries throughout Canada and half of the provinces have urban casinos (Campbell & Smith, 1998). Consequently, a growing number of North Americans now live within easy access to one or more gambling venues. It is estimated that 90 percent of United States residents live within 50 miles of a major gambling facility, whether a casino, racetrack, teletheatre or card club (National Opinion Research Center, 1999a). Young adults in North America, who represent a substantial proportion of the population, have been exposed to legal gambling over their entire lives. Key markets targeted by gaming companies include middle class individuals, youth, women and seniors.

National Expenditure and Turnover

United States gambling turnover totalled US$639 billion in 1997 and came second after technology in rankings of leisure spending, ahead of both durable goods and non-durable goods (The Wager, 1998). This represents an approximate ten-fold expansion of the gaming industry since 1976. However, these other types of leisure spending do not allow reinvestment of winnings, the 'churn' factor, which can confuse the comparisons of 'turnovers' of different types of leisure activities. The casino handle exceeded that of all other categories of gambling combined. Other major categories, in declining rank order, were Indian gaming, lotteries, horses, video lotteries, charitable games and greyhounds. Total expenditure increased by 6.2 percent over that of the preceding year, indicating a slowing in the growth rate that prevailed throughout the past decade. Eadington, referred to this period of rapid expansion as "…a veritable avalanche of proliferation" and further commented "…this rapid proliferation is nothing short of phenomenal, especially in light of society's long-standing prohibition against easily accessed commercial gaming" (Eadington, 1992). Similar trends occurred in Canada and, as mentioned previously, in many other parts of the world.

National Surveys: Gambling Participation and Expenditure

Results of general adult population surveys over several decades in the United States show that gambling participation was substantial even before most Americans had access to legal gambling opportunities. A 1950 Gallup poll estimated that 57 percent of the American population gambled. The 1975 national survey found that 68 percent of adults reported having gambled at some time in their lives (Kallick et al, 1979). Sixty-one percent said they had gambled during the previous year. Of these, 13 percent confined their gambling to private, informal bets. Almost the same overall percentage, 62 percent, reported gambling during the previous year in a 1993 telephone survey (Mississippi State University Gambling Group, 1995). However, a few years earlier, in 1989, a similar poll found that 72 percent of the adults surveyed had gambled in the past twelve months (Fact Research, 1976; Kallick et al, 1979; Hugick, 1989 [all in Mok & Hraba, 1993]). State level surveys conducted during the 1980s and 1990s have reported lifetime participation rates of 64 to 96 percent and past year rates of 49 to 89 percent. A meta-analysis of 120 of these surveys yielded a general United States lifetime participation estimate of 81 percent (Shaffer, Hall & Vander Bilt, 1997).

Our literature search did not locate relevant Canadian national survey data. However, Canadian provincial surveys conducted during the 1990s found that between 87 and 93 percent of provincial adult populations reported having gambled at some stage in their lives. These provincial participation percentages are somewhat higher than their United States state counterparts. A recent Canadian survey found that 27 percent of adult Canadians indicated they had participated in casino games, 13 percent in the past year (Canadian Gaming News, 1998).

The final report on the 1975 United States National Commission survey of 1,736 adult Americans is 560 pages in length and contains a wealth of information on gambling participation and the characteristics of people who engage in different forms of gambling (Kallick et al, 1979). Among many other things, the survey found wide regional variation in gambling participation. Less than 40 percent of respondents living in Southeast states reported gambling in the past year. In the Northeast, the corresponding figure was 80 percent. Males, large city residents, Catholics, Jews and younger adults had relatively high levels of participation. Relative to those from Europe (excluding Great Britain), people with Spanish speaking or African ethnic backgrounds had lower rates of gambling participation.

An interesting finding of the 1975 survey concerned the relationship between exposure to gambling and gambling participation. Compared to non-gamblers, people who gambled were more than twice as likely to respond that they had been exposed as children to "a relatively large number of gamblers." Similarly, relative to non-gamblers, gamblers were twice as likely to have lived as an adult in a state where gambling was available. In the case of Nevada, 78 percent of adults had gambled in 1974, compared with 61 percent for the country as a whole. Reported average expenditure of Nevada residents was also more than double that of other Americans. These relationships between availability/exposure and current gambling behaviour were even stronger in the case of illegal gambling. Although national in scope and fully documented, it should be noted that the sample was not large, thus limiting the confidence that can be placed in some of the subgroup comparisons.

Until 1998, the National Commission study was the only comprehensive national survey of gambling behaviour and attitudes to have been conducted in the United States. This year, the preliminary results of a second nation-wide survey have been released (National Opinion Research Center, 1999a; 1999b). This study consists of the following:

- a national telephone survey of 2,417 adults
- an intercept study involving face-to-face interviews with 530 patrons of 21 gaming facilities
- a national telephone survey of 534 youths aged 16 and 17 years
- an examination of social and economic indicators and estimated gambling expenditures from 1980 to 1996 for a national sample of 100 communities
- case studies of ten communities with large-scale casinos in close proximity.

Although the 1975 and 1998 national surveys used somewhat different methodologies, e.g. the former used face-to-face interviews for the main survey and the latter telephone interviews, they appear to be sufficiently similar to enable comparisons to be made between the findings of both studies. Overall, there appears to have been little increase in past year gambling participation (61 percent in 1974 versus 63 percent in 1998). Lifetime participation, on the other hand, has increased markedly (approximately 68 percent versus 85 percent). As the authors of the 1998 survey note, given the vast expansion in gambling availability and expenditure, the past year findings are somewhat surprising.

The figures, however, do not index the frequency of annual activity by those who do participate. It is highly probable that further analysis of the findings will show significant increases in the frequency of participation in some types of gambling.

Past year participation in lotteries doubled from 1974 to 1998. A slightly larger increase was found

for casino gambling. Past year bingo involvement decreased by two-thirds and the authors report that they expect to find similar decreases in pari-mutuel betting when they undertake additional analyses.

The percentage of women who reported ever having gambled increased by 20 percent from 1974 to 1998. For males the increase was ten percent. Past year female participation increased slightly but male participation stayed the same. Although men still participate more than women, the difference between the genders has narrowed to a few percentage points for both lifetime and past year participation.

The percentage of people who reported ever having gambled increased in every age category considered. This increase was smallest in the 18-24 years group (5%) and greatest in the 65 plus group. The oldest group percentage more than doubled, albeit from a much lower baseline. Lifetime participation across the four age groups in 1998 was roughly similar, varying by a maximum of about only five percent between any two groups. Given the sample size and complexity, these differences are probably not statistically significant. In 1974, the 65 plus and 45-64 year group to a lesser extent had much lower rates of participation than the two younger groups. With regard to past year participation, the oldest group again doubled. This contrasts with the youngest group that decreased by ten percent. However, because of their lower 'starting point' in 1974, Americans aged 65 and older still have lower past year participation rates than the other age groups.

A great deal of additional information on gambling participation and attitudes towards gambling should be available when the full report on the 1998 national survey is published. However, the relatively small sample size and the method by which it was obtained will place constraints on the number of different variables and relationships between them that may be considered. Other methodological factors and differences between the 1975 and 1998 surveys may also reduce the degree to which valid comparisons can be made between findings from the two surveys.

Population Surveys: Reasons for Gambling

Some surveys of gambling participation have also asked people why they gamble. Typically, over half say they gamble to win money. Other reasons given in a recent nation-wide survey, in descending order of frequency, include entertainment, excitement, curiosity, to socialise, to support worthy causes, as a distraction, and as a hobby (Mississippi State University Gambling Group, 1995). In the 1998 national survey, 64 percent of adult respondents said that winning money is an important reason why they gamble. It is interesting that most people say they gamble to win money yet, in the long run, the great majority loses.

The reasons people give for their behaviour and the 'real' reasons are not necessarily the same and both self assessed and other reasons for gambling vary not only from person to person but also from one form of gambling to another (Walker, 1992; Chantal & Vallerand, 1996). The present review does not examine further the large research literature on the motivational, cognitive, personality and social factors that may explain why people gamble, continue to gamble and stop gambling. Walker (1992) and Wildman (1998) cover this topic and provide an overview of relevant research.

Population Surveys: Attitudes

According to a Gallup survey in 1996, 27 percent of adult Americans said gambling is immoral, down from 32 percent in 1992 (Heubusch, 1997). In the same year, a telephone survey of just over 1,500 adult members of households found that 70 percent said that gambling should be legal (Cosby et al, 1996). Slightly more said alcohol should be legal and somewhat fewer indicated likewise for cigarettes. Males, Catholics and respondents from Northeast and Western regions were significantly more likely to be in favour of gambling legalisation. This broadly reflects the patterns of participation just outlined.

Heubusch (1997) also found that two-thirds of Americans agreed that "legalised gambling encourages the people who can least afford it to squander their money" and 61 percent said that "legalised gambling can make a compulsive gambler out of a person who would never gamble illegally". The 1998 national survey found that 35 percent said that legalised gambling was either bad or very bad for society. According to a Scripps Howard survey, about one-third of Americans reported knowing someone whose gambling caused him or her financial problems (Scripps Howard, 1998). However, in 1995, according to the Promus Companies, owner of Harrah's Entertainment, Inc., 61 percent of Americans also agreed that gambling "is harmless fun and the government should make it legal so it can be regulated and taxed," up from 53 percent in 1992. Furthermore, 55 percent of Americans agreed that they "would favour the introduction of casino gaming into my local community because of its benefits to the local economy," up from 41 percent in 1992 (The Promus Companies, 1996). These apparently discrepant findings may not be erroneous. Rather they could reflect a polarisation in attitudes within the community as well as, perhaps, the human capacity to hold contradictory viewpoints and to behave at variance with attitudes and beliefs.

Population Surveys: Cultural and Sociodemographic Diversity

There is a broad array of research showing that gambling participation in general, as well as participation in particular types of gambling, is linked to the communities in which these behaviours occur and to the norms and values of members of those communities. For example, differences have been found in the types of gambling preferred by middle-class and blue-collar gamblers, by men and women, and by White and Black Americans (Drake & Cayton, 1945; Henslin, 1967; Light, 1977; Strachan & Custer, 1993; Zola, 1964).

Gender has been strongly linked to participation in different types of gambling. In the 1970s, women were significantly less likely than men to gamble at casinos and on lotteries but more likely than men to participate in charitable gambling, such as bingo and raffles (Kallick et al, 1979). In the 1990s, while men are still more likely to wager on games of skill and horse racing, women are just as likely as men to gamble at casinos and on lotteries (Volberg & Banks, 1994). Recent research suggests that although there are now few differences between men and women in gambling frequency and wagering levels, the scope of women's gambling (that is the number of different types of gambling in which women participate), is significantly narrower than the scope of men's gambling (Hraba & Lee, 1996).

Age is also linked to gambling participation and attitudes. Numerous studies show that older Americans are less likely than younger Americans to gamble and, when they do gamble, to be involved in fewer activities (Kallick et al, 1979; Mok & Hraba, 1993; Svendsen, 1998). However, as mentioned above with respect to the 1998 national survey, the gap between older adults and other adults has narrowed. Age has also been correlated with approval of gambling. Among Americans younger than 35 years, 58 percent approve of gambling as a revenue source, whereas among those aged 55 and older, only 39 percent approve of gambling for this purpose (Scripps Howard, 1998).

In contrast to adults, gambling increases with age among adolescents through to young adulthood. In states where studies of adult and adolescent gambling have been carried out, gambling participation increases among older adolescents and peaks among adults aged 21 to 29 years (Volberg, 1996c). In the 1998 national survey approximately two-thirds of 16 and 17 year-olds reported having ever gambled, compared with 85 percent of adults. Researchers in the United States have consistently found that the majority of adolescents have gambled and many under-age youths have gambled on activities that are legal only for adults, such as lotteries, horse races and casinos. Boys gamble more than girls; older youths gamble more than younger adolescents; Black, Hispanic and American Indian adolescents gamble more than White or Asian adolescents (Stinchfield et al, 1997; Stinchfield & Winters, 1998; Winters, Stinchfield & Kim, 1995).

There has been little systematic research on gambling among adult ethnic minorities in North

America. An early study of gambling among White, Black and Hispanic adult residents of New York City found that Whites were more likely to gamble regularly than Blacks or Hispanics although Hispanics were more likely than Whites or Blacks to gamble on illegal numbers games (Volberg & Steadman, 1988b). In surveys in Georgia, Louisiana and Mississippi, Blacks were less likely than Whites to have ever gambled although this difference may have been due to very low gambling participation rates among older Black women. In general, Blacks are more likely than Whites to play illegal numbers games and, in states where they are available, daily lottery games (Volberg, 1997a). In Texas, where Blacks and Hispanics represent substantial proportions of the population, Hispanics are more likely than Whites or Blacks to play lottery games and bingo. Young Hispanic men are the group most likely to gamble on dog and cock fights while young Black men are the group most likely to gamble on private card games (Wallisch, 1996).

A recent telephone survey of adult Chinese residents of Toronto, Canada, found that 80 percent reported having gambled in their lifetimes (Kwan, 1997). This is similar to the lifetime participation rate of 77 percent for the Toronto general adult population (Turner, 1998). While inconsistent with the stereotype of high gambling prevalence among Chinese living in Western societies, this finding does not preclude the possibility of disproportionately high levels of involvement among a proportion of gamblers. In addition, caution is required in comparing the two Toronto studies as 'gambling' may mean different things to respondents in the respective samples. In the Chinese survey, males and those resident 11-15 years had significantly higher participation rates than females, part-time workers and those resident for less than 11 years or more than 15 years.

Polarisation of Attitudes and Opposition to Gambling

Much of the initiative for gambling legalisation in the 1970s and 1980s grew out of the reluctance of state and provincial legislatures to raise taxes. Measures were often taken to earmark funds from newly legal forms of gambling for specific purposes including education, property tax relief and services for seniors. Although public attitudes toward gambling have generally become more accepting, grassroots opposition to legal gambling began to emerge in the mid 1990s, as coalitions of citizens' groups formed to prevent or repeal these increasingly ubiquitous activities.

Local community and citizens' groups have been particularly effective in working to limit the availability of electronic gambling machines. In Nova Scotia and New Brunswick, thousands of video poker machines have been summarily removed from non-licensed establishments. In Alberta, the provincial government recently held a summit conference to debate the question of how to regulate the availability of widespread video poker machines. In Ontario, government efforts to place 20,000 video lottery terminals around the province have been stalled along with efforts to establish approximately 40 permanent charitable casinos (Warson, 1998). Similar opposition movements have arisen in Europe and other parts of the world. For example, in the Netherlands, efforts to mitigate the negative impacts of gambling led the government to reduce the number of slot machines from 75,000 to 45,000 in 1994 (Remmers, 1997). In Spain, the national and provincial governments are examining initiatives to reduce the approximately 430,000 machines that are placed in bars, taverns, restaurants and arcades throughout the country.

Throughout the United States, efforts to establish new forms of gambling or alter the conditions under which existing types of gambling operate have been defeated in recent elections (Doocey, 1996). In South Dakota, elections have included referenda to repeal video lottery terminals. In a recent statewide referendum, several parishes in Louisiana voted to ban video poker machines. In South Carolina, legislative efforts are underway to ban video gambling throughout the state. In Las Vegas, the mayor has asked a panel to consider removing slot and video-poker machines from neighbourhood businesses (Novak, 1998).

It is possible that we are seeing the beginnings of another broad wave of gambling restriction in North America. However, as the history of the United States with Prohibition shows, there are difficulties in making any widespread behaviour illegal. Laws against gambling are difficult to

enforce because so many individuals engage in these behaviours. Further, governments now permit many types of gambling and it is difficult for citizens to make distinctions between similar activities, only one of which is sanctioned by the state. For example, many governments permit lotteries while laws prohibiting 'numbers' or 'policy' games (essentially, illegal lotteries) remain on the books. In legalising gambling machines, many governments have made the argument that illegal, "grey" machines will be put out of business. However, citizens find it hard to distinguish between machines owned by the government and those owned by other, sometimes illegal, operators.

Further expansion of gambling throughout North America is highly probable in the foreseeable future. It remains to be seen to what extent mounting public opposition to certain forms of gambling, most notably gaming machines and casinos, will place constraints on the speed of growth or, ultimately, lead to its reversal.

Australia

Introduction

As indicated previously, by international standards, Australia has historically had a high level of gambling participation and probably has the highest national per capita expenditure currently.

National and Regional Expenditure and Turnover

Australian national gambling turnover and net expenditure remained relatively stable during the 1970s and 1980s. From 1972 to 1990, gambling expenditure (total 'losses') gradually increased from A$308.60 to A$426.35 per capita (expressed in 1997 inflation adjusted terms). As a percentage of total household disposable income, this represented a shift from 1.5 to 1.9 percent. In 1972, track betting constituted almost half of the total; in 1990 it was a third. For most of the period from 1972 to 1990, New South Wales (NSW) expenditure as a percentage of household disposable income was approximately double that of any other state or territory, in large part reflecting the widespread availability of gaming machines in NSW (Tasmanian Gaming Commission, 1998).

During the 1990s, gambling expenditure increased rapidly in Australia. By 1998, total national turnover was approximately A$80 billion and net expenditure exceeded A$11 billion (A$818.84 adult per capita and 3.20 percent of household disposable income). This expenditure compares with annual household expenditure of approximately A$13 billion on alcohol, A$9 billion on household appliances and A$6 billion on electricity, gas and fuel. In 1997/1998, just over half of total gambling expenditure was on gaming machines outside casinos (52%), followed by 20 percent on casinos, 15 percent on track betting, 11 percent on lottery products and three percent on remaining activities including bingo and charity raffles. Total 1998 national expenditure increased by approximately ten percent relative to the previous year. (Productivity Commission, 1998; Tasmanian Gaming Commission, 1999)

Although the Australian states and territories vary less than they did in the past with respect to the availability of different forms of gambling and gambling expenditure, differences remain. Table One provides state and territory adult per capita gambling expenditures. Table Two shows changes in state and territory gambling expenditure as a percentage of total household disposable income. Inspection of Tables One and Two reveals that while New South Wales retains its historical ascendancy, Victoria follows closely behind. In terms of per capita gambling expenditure, the Northern Territory comes next, followed in descending order by ACT, Queensland, South Australia, Western Australia and Tasmania.

Table One: Australian State Adult Per Capita Gambling Expenditure 1997/98[a]

Gambling Form[b]	NSW	Victoria	Queensland	SA	WA	Tasmania	ACT	NT	Total
Track	133.48	124.75	113.07	92.19	111.26	90.13	82.15	142.66	120.24
Lottery [c]	63.16	78.99	64.96	60.12	102.37	47.37	57.17	106.31	70.88
Machines	635.98	493.31	239.60	351.41		68.01	555.30	152.95	424.13
Casino	94.94	213.98	186.57	67.75	270.81	217.36	75.46	367.55	161.36
Total	963.17	921.00	694.32	617.20	527.46	507.67	797.62	861.47	818.84

a Compiled from data provided in the Tasmanian Gaming Commission (1999)
b Only the four major categories are shown separately, however all legal forms are shown in the totals
c Includes lottery, Tattslotto, and Lotto, but not Instant lottery

Table Two: Changes in Australian State Gambling Expenditure as a percentage of Household Disposable income: 1990/91 – 1997/98[a]

Year	NSW	Victoria	Queensland	SA	WA	Tasmania	ACT	NT	Total
1990/91	2.80	1.29	1.92	1.68	2.05	1.92	1.93	2.56	2.06
1997/98	3.59	3.49	2.95	2.64	2.14	2.33	2.38	3.01	3.20

a Compiled from data provided in the Tasmanian Gaming Commission (1999)

It is evident from Table One that the proportion of expenditure associated with each of the major forms of gambling varies across states and territories. In five, gaming machines account for considerably more expenditure than other forms. In three - Western Australia, Tasmania and the Northern Territory - casinos dominate, albeit that most casino income is now also derived from machines. Track betting ranks second in five jurisdictions.

As with Canada, our literature search did not locate a nation-wide survey of Australian gambling participation and expenditure. However, there are a number of state-wide surveys, including repeat surveys in some states. These studies indicate that during the present decade, over 90 percent of Australian adults report having gambled at some time, 65-90 percent in the past 12 months. These participation levels are appreciably higher than those found for the United States as a whole. Because of their relevance to the planned New Zealand national survey, these studies are considered in some detail. A forthcoming Productivity Commission report will include findings from a 1999 Australian national survey. This will be reviewed in the NZGS report on phase one of the national prevalence survey.

Victoria

Extensive information on gambling participation and attitudes towards gambling is available for Victoria. These topics are probably more thoroughly documented in this state than in any other jurisdiction in the world. The great majority of the surveys are part of an ongoing research programme commissioned by the Victorian Casino and Gaming Authority (VCGA). The Authority is a statutory body with, among other things, a responsibility to conduct research into the social and economic impacts of gambling in Victoria. This information is of particular interest in that during the period of data collection, both electronic gaming machines and casinos were introduced to the state. Additionally, gambling expenditure increased far more rapidly in Victoria than in any other Australian jurisdiction.

From 1990 to 1998, total Australian gambling expenditure as a percentage of household disposable income increased from 2.06 to 3.20 percent. In Victoria, the corresponding figures were 1.29 and 3.49 percent. On this measure, Victoria moved over a six year period from having the lowest expenditure by a significant margin to having the second highest. (Tasmanian Gaming Commission, 1999.)

From May 1992 to September 1997, the VCGA commissioned five state-wide telephone surveys of adult gambling participation. Although detailed description of the methods used is lacking in the reports published by the Authority, and no indication of the response rates is given, they appear to be sufficiently similar to allow meaningful comparison of the results over time. The fourth and fifth surveys, both published in 1997, provide overviews of the previous studies (VCGA, 1997a; 1997b). In 1997, the Authority also conducted a similar survey of older adults aged 55 years and over (VCGA, 1997c). The 1992 survey was undertaken prior to the introduction of gaming machines. The 1994 survey was conducted after the introduction of machines but before the opening of the temporary Melbourne Casino. The 1995, 1996 and 1997 surveys were completed following the opening of this casino and a further substantial increase in the number of gaming machines. Summaries of the major participation, reported expenditure and attitudinal findings will now be outlined.

Although there was a slight drop in past year participation rates in 1995, overall, levels of participation increased from 75 percent of adults in 1992 to 87 percent in 1996 and 86 percent in 1997. Gender differences were not evident. In the 1996 survey higher rates of participation were found for 30-49 year olds, middle income earners and upper blue collar workers. Lower rates were found for people aged over 60, low income earners, students, people engaged in "home duties" and pensioners. However, the highest and lowest groups varied by only 10 percentage points, indicating that gambling is widespread across major sociodemographic categories in Victoria. This relatively even distribution across groups was also evident in the 1997 survey. Specifically, past 12 month gambling participation varied little across gender, age, occupation and city or country residence. There also appeared to be a steady increase over time in the average number of gambling activities undertaken by gamblers (from 2.2 to 3.1) until 1996. However, in 1997, the number dropped back to 2.6, just slightly higher than in 1995.

Lotto and keno remained the most common activities engaged in from 1992 to 1997. In the four surveys, 60 to 66 percent of respondents participated at least once in these activities during the preceding 12 months. Raffles had the next highest 12 month participation rate in 1996 (54%) and in 1997 tied with Lotto for top ranking (61%). Raffles were not included in the previous surveys. In 1992 gaming machine participation was 20 percent. In 1994, following the introduction of gaming machines, it increased to 41 percent and remained at about this level in 1996 and 1997. Scratch tickets (instant lotteries) increased from 28 percent in 1992 to 37 percent in 1994 and stayed at a similar level in 1995, 1996 and 1997. In both the 1992 and 1994 surveys, seven percent of respondents reported gambling in a casino. This increased to 22 percent following the opening of Melbourne's temporary Crown casino in 1994 and remained at this level in 1996. It increased slightly to 25 percent in 1997. Betting on horse races appeared to have declined in 1995 (15% relative to 19% in 1992 and 21% in 1994) and remained at this lower level in 1996 and 1997. Informal card betting may have increased in 1996 (14% relative to 8-10% in the preceding surveys). Other forms of gambling were engaged in less often (1-8%) and appear to have remained relatively stable from 1992 to 1997.

Although not stated by the authors of the survey reports, extreme caution should be taken in assuming that any of these changes or trends, other than those pertaining to increases in gaming machine and casino participation, were statistically significant. Sub-sample sizes were often small, confidence intervals were not stated and inferential statistics were not cited. Nevertheless, it appears that casino and gaming machine participation increased substantially from 1992 to 1997. Apart from track betting which may have declined somewhat, other forms of gambling either increased or remained at about 1992 levels. These findings are broadly consistent with industry expenditure data.

Although there was no gender difference in overall past 12 month gambling participation, or with respect to the most popular forms of gambling (Lotto, raffles, machines and casino gambling), there were differences in some other activities. Men reported substantially higher participation rates in track and sports betting. Women did likewise for bingo and scratch tickets. These gender differences were

stronger for regular gamblers who gambled at least once a month. Regular male gamblers also reported participating more in casino gambling than their female counterparts (68% versus 32% in 1997).

Regular machine, Lotto, scratch ticket and informal card gamblers - when measured by both last 12 months and at least once a month involvement - were fairly evenly distributed across gender, age and occupational groupings. Gaming machine participants were over-represented in non-metropolitan areas. Casino gamblers who gambled once a month or more, in addition to being more likely to be male, were also younger on average and more likely to be resident in a metropolitan area and not in the workforce. In addition to an over-representation of men, regular horse racing gamblers were more likely to be in the upper white collar occupational category. Regular bingo players were more likely to be older women not in the workforce.

Survey respondents who gambled were asked how often they participated in gambling activities per week and how much time they spent gambling per week. The frequency and duration of play appears to have risen until 1995 and then progressively declined in successive surveys. Changes were also evident in self reported expenditure, calculated by multiplying the frequency of participation for each event by the perceived expenditure each time the activity was undertaken.

The weekly perceived expenditure of Victorian gamblers was estimated from the survey samples. Average reported spending per week increased from A$66.8 million in 1992 to A$83.9 million in 1996. In 1996, Lotto and Keno accounted for A$28.3 million and horse racing A$18.3 million. Expenditure on these activities appeared to drop substantially in 1995 but recovered to approximately 1992 levels in 1996. Gaming machines accounted for the third largest amount of reported expenditure in 1996, A$11.6 million, an apparent reduction from a high point of A$15.1 in 1994. Informal cards accounted for A$7.9 million in 1996, relative to A$6.6 million in 1992. Greyhound betting and bingo accounted for A$3.3 and A$3.2 million respectively and appear to have been relatively stable across the four surveys. Casino gambling expenditure appears to have increased substantially immediately after the opening of the temporary Crown casino (i.e. A$8.9 million in 1995) but returned to 1992 and 1994 levels in 1996 (A$3.1 million). Scratch tickets, raffles and trotting ranged from A$2.3 – A$2.6 million in 1996 and do not appear to have changed over time. The three categories of sports betting included in the surveys account for very low levels of spending.

The proportion of personal income spent on gambling was also calculated from respondent expenditure and personal income data. In 1995 and 1996, on average, nine percent of income was spent on gambling, a substantial increase on 1992 and 1994. It was particularly high among 18-19 year olds (17%) and people born in Europe (21%). The lowest figure was for Asian/Pacific born respondents (2%). This latter finding is at variance with previous research on Pacific Islander gambling participation in New Zealand (Abbott & Volberg, 1991; 1996a). The report authors do not qualify these findings with a note that the sub-samples involved are very small and many estimates are likely to have wide margins of error. However, they do indicate that “outliers”, presumably respondents reporting very high expenditure, have been removed from some analyses but do not provide further details.

Although much of the subgroup data reported is statistically meaningless, differences between the larger categories probably have some significance. From this section of the data set, the authors of the report conclude there “is a clear trend of increasing proportions of income spent on gambling” (p.15). This does appear to be the case from 1994 to 1995. In 1994, 47 percent of gamblers spent under one percent of their income on gambling. In 1995, this percentage had fallen to 38 percent. The percentage spending one to ten percent increased from 39 to 46 percent over the same period. The 1995 findings were very similar to the 1996 results (37 and 48 percent respectively), increasing our confidence in the conclusion that gambling expenditure, as a proportion of income, had increased.

In addition to considering reported expenditure, the 1996 and 1997 studies also compared the survey estimates with actual official expenditure on legal forms of gambling during the 1995/1996 and 1996/1997 years. These findings are of considerable interest. Comparison of the survey weekly expenditure estimates with official expenditure records indicate that gaming machine and casino gamblers

substantially underestimate or under-report their expenditure (by a factor of 2 to 3). On the other hand, expenditure on all other forms of gambling included in the survey was greatly over-estimated. The net effect was an overestimate of expenditure from the survey. This is at variance with what is typically found when industry and survey expenditure estimates are compared, although it is consistent with findings from several state-wide surveys in the United States.

There are a wide variety of reasons why these differences could have arisen. A number are listed in the report and others were mentioned previously in this review. Earlier, it was noted that self reported expenditure information is very sensitive to the phrasing of questions. Among other things, the wording alters the degree to which total expenditure versus net expenditure (total expenditure minus winnings) is provided. This aspect is likely to vary considerably from one form of gambling to another and may be the major reason for the discrepancies in the present instance. For example, in the case of lottery games, winnings occur at a different point in time from when purchases are made and are thus not likely to be taken into account when typical gambling session expenditure or outlay is reported. In the case of gaming machines, the initial outlay may be regarded as the total outlay and not take into account accumulated winnings.

Other explanations include the possibility that respondents over- or under-report their actual expenditure and/or the frequency of gambling participation. Reluctance to report accurately to an interviewer may play a role and this reluctance may vary depending on factors such as interview mode, e.g. face-to-face or telephone. These factors may also interact with respondent characteristics such as ethnicity and gender and/or with interviewer characteristics. In any event, while 'reported' expenditure measures can play a useful role in examining changes over time, they have a complex relationship with 'actual' expenditure and clearly require a great deal more investigation and refinement. Apart from leading to improved measurement, this line of research could be of value in enhancing our understanding of different aspects of gambling and the motivations and cognitions of gamblers and problem gamblers.

In the context of the Victorian surveys, two further points need to be made about expenditure data. First, the sample sizes are undoubtedly too small to accurately 'capture' gambling activities with low participation rates. Secondly, actual expenditure includes visitors from other states and abroad. Visitor expenditure will vary across different forms of gambling. However, apart from casino gambling where estimates may be available, their contribution is usually unknown. In some situations, visitor expenditure could be expected to play a part in explaining discrepancies between self report and official expenditure.

Finally, before leaving the topic of expenditure, it should be noted that the Victorian survey reports contain a great deal more relevant information. In the present context it is of interest that, in addition to the calculated weekly expenditure measure referred to above, expenditure was also assessed by asking respondents to estimate their total weekly outlay on gambling. Gamblers average weekly expenditure in 1996 was A$18. This contrasts with the average weekly calculated expenditure of A$29 per week, again illustrating the sensitivity of expenditure estimates to question phrasing. Using the estimated weekly outlay measure, there appears to have been no significant change from 1992 to 1997. Males also reported spending almost double that of females, suggesting gender differences in perception and/or reporting as well as in actual gambling behaviour.

The 1996 report included a cluster analysis based on the attitudinal data and information concerning a variety of leisure activities. From this analysis five sample segments were formed. These clusters were replicated in the 1997 report using discriminant function analysis. Although methodological and analytic details were not provided, the procedure appears to have been similar to that commonly employed by market researchers to segment survey data for market research and advertising purposes. The five groups were examined in relation to a variety of gambling participation variables and defined as follows: Disinterested Gamblers (25% in 1996; 26% in 1997), Occasional Gamblers (35%; 37%), Social Gamblers (7%; 12%), Acknowledged Heavy Gamblers (9%; 4%) and Committed Heavy Gamblers (9%; 7%). A further Non Gambler (12%, 14%) group was also identified. Each group had a somewhat distinct profile in terms of demographics, attitudes and gambling behaviour.

This approach to the classification of gamblers, rather than focusing on the classification of gambling

activities per se, may be worthy of further development. The Committed Heavy Gambler group, for example, may be of interest to researchers and others concerned about problem gambling. This group is comprised mostly of males. Members were younger on average although there was a sub-group aged over 60 years. While these heavy gamblers participated regularly in a wide range of gambling activities including machine and casino gambling, they had a preference for track betting. Excitement/buzz and relief of boredom were included among their stated reasons for gambling. Over a third acknowledged that they had another bet after a loss and they were least likely to agree that gambling is a serious social problem and most likely to agree that gambling does more good than harm.

The 1995, 1996 and 1997 VCGA surveys also asked a variety of attitudinal questions with five- and ten-point Likert scale response options. From 1995 to 1996 there appeared to be a decline in the stated appeal for gaming machines and casinos on the part of both gamblers generally and respondents who regularly participate in these activities. No further changes were noted in 1997 with respect to machines although the appeal of casinos for regular participants appeared to have increased slightly. The authors claimed that these shifts in attitude were statistically significant but provided no details of the tests used or the rationale for their use.

Generally, there was moderate disagreement with the statement "Gambling does more good for the community than harm" in both 1995 and 1996. However, strong disagreement with this statement increased markedly from 33 percent in 1996 to 57 percent in 1997. There was some agreement with the statement that "Gambling is a serious social problem" on the first three occasions it was included in the survey. In 1997, the percentage strongly agreeing with this statement increased to 60 from the 1996 percentage of 55. Older people, non-gamblers and women were more likely to agree with this statement. There was also strong agreement with the statement "Gambling related problems have got worse in the last four years", included in the 1995, 1996 and 1997 surveys. No change was evident from 1996 to 1997. Reasons given by 45 percent or more respondents (from options presented) included the "introduction of gaming machines", "opening of casino", "greed/money" and "unemployment/ recession".

VCGA survey participants were also asked about their reasons for gambling. The large majority (73% in 1996; 69% in 1997) indicated that the "thrill/dream of winning" was their primary reason for gambling. This was particularly the case for lotto, raffles and scratch tickets. The second most frequently mentioned reason (46%; 40%) was "social reasons". This was relatively stronger for gaming machine, casino and card gamblers.

A VCGA commissioned study of Victorians aged 55 years and over was undertaken in 1997, in part in response to media and public attention being given to gambling among older people following the introduction of gaming machines and opening of the Crown Casino (VCGA, 1997c). The study included a telephone survey of 807 people, focus groups and interviews with representatives of community organisations and industry groups. Some of the survey questions had been used in the earlier adult surveys, allowing comparison across up to five points in time. Sample sizes for older groups in the earlier surveys were small, ranging from 291 to 524.

The survey of older people found that 86 percent had engaged in some form of gambling during the preceding 12 months, effectively the same as the general adult population rate of 87 percent in 1996. As with adults generally, participation rates have risen steadily, in the case of the older group from 70 percent in 1992. In that year 75 percent of the general adult population gambled. In 1997 88 percent of older males and 84 percent of older females reported gambling. This difference is unlikely to be statistically significant. Of those who were retired and on a full pension, 89 percent gambled in the last 12 months.

Of the respondents in the survey of older people who had gambled in the last 12 months, the number of times they participated during the previous week appeared to have remained the same from 1992 to 1997. The average amount of time spent gambling per week appeared to have steadily reduced. The average calculated weekly amount spent by people who gambled decreased from A$34 per week in

1992 to A$17 per week in 1997. Average perceived weekly expenditure was A$10 per week in 1992. For the last three surveys it was A$14, slightly less than the general adult figure. No change in gambling expenditure as a percentage of total income was evident over time. In 1997, 82 percent reported that they spent less than five percent of their income on gambling. Eleven percent spent more than ten percent of their income in gambling.

In 1997 the rank order of gambling activities participated in once a year or more by older people was generally similar to the rank order for the general adult population. Sixty-three percent reported engaging in Lotto and related lotteries, 50 percent purchased raffles, 42 percent gambled on machines outside casinos, 32 percent purchased scratch tickets and other instant lotteries, 19 percent bet on horse races, 19 percent gambled on gaming machines at casinos and ten percent participated in bingo. Compared to adults generally, relatively more older adults gambled on machines outside casinos and played bingo. Relatively fewer played informal card games for money or cards or table games at casinos. Older men were somewhat more likely than older women to indicate that they preferred participating in Lotto-type games and betting on horses. Older women more often said they preferred gaming machines outside casinos and bingo. Twelve percent of men and 16 percent of women said they had not bet in the last 12 months. This compares with 13 percent for the general adult population. Only six percent of the older respondents acknowledged that gambling was important or very important to them.

From this survey information, it would appear that as with the United States nationally, gambling participation has recently increased proportionately more among older adults than in the remainder of the adult population.

In 1996 the VCGA carried out a study of perceptions of and attitudes towards gambling. This study involved a review of relevant information already held by the Authority, community consultations, focus groups and a telephone survey of 602 adult Victorians (VCGA, 1996). From this predominantly qualitative study, the Authority concluded that it was widely believed that society had changed as a result of recent increases in the availability of gambling but that there was significant polarisation in views concerning whether the changes were primarily positive or negative. Positive changes noted by respondents included the belief that illegal gambling had declined, and that entertainment and economic benefits for the state and community had increased. Negative changes included perceived promotion of gambling by government and increased opportunities for those prone to problem gambling.

The 1996 telephone survey found that 61 percent agreed that “on the whole, gambling is an acceptable activity in our community”. However, 56 percent strongly agreed that “gambling is too widely accessible in Victoria” and a majority agreed that the age of entry to gambling facilities should be raised from 18 to 21 years. Respondents were almost equally divided on whether or not the current level of gambling was beneficial for Victoria and whether gambling activities should be advertised. Fifty-seven percent agreed that the number of poker machines should be reduced and approximately half indicated that restrictions on gaming machines and the Crown Casino should be tightened. Ninety-five percent disagreed with the statement that “Victoria should have more casinos”, 86 percent strongly so. A large majority agreed that gambling is a real social problem for many people, that more people are having problems, that services are inadequate to assist problem gamblers and their families and that more should be done to help them. Other than perhaps female gender and lower levels of interest and involvement in gambling, no other sociodemographic characteristics appeared to be related to respondent attitudes towards gambling. The report concluded that “the reasons behind attitudes to gambling are far more subtle and possibly relate more to lifestyle and philosophical views, factors not covered in this quantitative study” (p.103).

Although considerable attention has been given here to the six VCGA reports, they represent only a modest sample of the studies commissioned by the Authority that have at least some relevance to the topic of gambling participation and attitudes towards gambling in Victoria. The other reports, however, primarily address wider economic and social impacts associated with gambling.

New South Wales

As indicated above, New South Wales was the state with the highest adult per capita expenditure on gambling in 1998 and for many years greatly exceeded other Australian states and territories in this respect. It also has a larger population than other jurisdictions, which means that it has a significant influence on overall Australian gambling expenditure statistics. While casinos have only been introduced recently, New South Wales has a long history of readily accessible gaming machines and a number of other forms of gambling. Until recently, machines were located exclusively in more than 1,400 registered clubs with a collective membership of approximately 2.5 million people. It is estimated that 20 to 25 percent of club patrons regularly play poker machines (New South Wales Department of Gaming and Racing, 1995). In 1998, legislation was passed allowing up to 15 club-type gaming machines to be located in hotels. In that year, the new Sydney Harbour Casino opened with 1,000 machines and 200 gaming tables. In 1998, gaming machines outside casinos accounted for over 66 percent of total gambling expenditure in New South Wales (Tasmanian Gaming Commission, 1999).

Considering that gaming machines have been legal and widely distributed throughout New South Wales since the mid 1950s and given their continued dominance in the gambling market, it is surprising that there has been relatively little research on community participation in this form of gambling. Interestingly, the first relevant survey appears to have been conducted by the State Government of Victoria (1994). This study involved 3,000 adult respondents from New South Wales and the neighbouring Australian Capital Territory (ACT). From Table One it is evident that ACT and NSW have virtually identical per capita expenditures on gaming machines and other major forms of gambling other than track betting.

The 1994 survey was conducted prior to the introduction of gaming machines in Victoria, to provide that state government with information regarding likely future impacts. Twelve percent of respondents at that time reported recent gaming machine participation with an average reported annual per capita expenditure of A$560 per year. Males participated approximately twice as often as women and reported spending considerably more. Differences between age groups were not great other than for people aged under 17 years and 80 years and older. The 20-24 and 65-69 year old age groups reported somewhat higher participation rates. Divorced and married respondents and those without dependent children below 14 years also reported higher rates of participation. Business people and those on high incomes spent less than other wage earners and people on benefits. Although beneficiaries did not spend more than wage earners overall, 'big spenders' on machines were over-represented in this group, as well as among people on lower incomes, those aged under 30 years and those living in public rental accommodation. Respondents born in Asia and Europe also reported substantially higher expenditure on gaming machines.

Some of these findings were corroborated by an interesting study that was conducted in Sydney during 1996 to examine the sociodemographic characteristics of gaming machine players (Breen, Hing & Weeks, 1997). This study used secondary data sources, namely information from the Australian Bureau of Statistics and the New South Wales Department of Gaming and Racing. From this information, distinctive sociodemographic features of adult resident populations in Sydney statistical local areas with high levels of poker machine expenditure per head of population were identified. A number of factors having a high correlation with per capita poker machine expenditure were identified, including many of those identified in the survey data summarised above. Because most of these factors were highly inter-correlated, factor analyses were conducted to refine the set of predictor variables. The resulting reduced set was then used in a stepwise multiple regression analysis with per capita gambling machine expenditure as the dependent variable. The strongest predictor, explaining 56 percent of the total variance, was a composite measure reflecting high levels of unemployment, no vocational or tertiary qualifications and people from non-English-speaking backgrounds. The groups, measured by country of birth, found to be over-represented in areas with high machine expenditure were: Malta, Greece, Lebanon, China, Italy, Vietnam, Yugoslavia, India and the Philippines. While this study could not and was not designed to identify the actual sociodemographic characteristics of machine gamblers, it provides information that can supplement that derived from population surveys. The ethnic data are

of particular interest given the difficulty involved in obtaining sufficient numbers in sample surveys and relative lack of information on ethnic minorities.

The only NSW survey located that covered all forms of gambling was conducted by a market research company as a part of a study by the Australian Institute for Gambling Research (AIGR) for the Casino Community Benefit Trust (Dickerson, Allcock & Blaszczynski et al, 1996). It was carried out in 1995 prior to the opening of the Sydney Casino. The report states that a random sample of 1390 adults, stratified by age and gender, was interviewed face-to-face. Metropolitan and 'country' respondents were included and the original target of 1,200 was reported to have been extended to 1390 "to ensure that people of non-English speaking backgrounds were proportionately represented" (p.27). The "refusal rate" for the city sample was reported as 48.5 percent; the country sample as 25.9 percent.

Approximately 80 percent of the population reported that they gambled. It should be noted that the phrasing of this question differed from that used in other studies to assess lifetime participation and that while the time frame was not specified, it was probably more a measure of 'current' or relatively recent gambling. Of the total respondents, 38 percent indicated that they gambled weekly or more, 19 percent monthly and 23 percent less often.

Fifty-seven percent said they participated in lotteries. Percentages for the other more popular forms of gambling were: instant lotteries (49), poker machines (38), TAB track betting and keno (both 20), card machines (16), totalisator track betting and casino (both 13), cards (10) and bingo (9). Forty percent of respondents participated in lotteries monthly or more. Twenty-five percent did likewise for instant lotteries and 15 percent of poker machine players also participated regularly. Other forms of gambling engaged in monthly or more by at least six percent of the sample included the TAB, card machines and keno.

Overall, while men and women were almost equally likely to report participating to some extent, men were much more likely to gamble weekly or more. Men were particularly more likely to report weekly or more frequent involvement in track betting and card machines but also, to a somewhat lesser degree, in keno and pools. Among weekly gamblers, women appeared to participate more than men in bingo. Country respondents reported much higher regular participation rates overall and, in particular, for instant lotteries, keno and poker machines.

The participation patterns were, to some extent, also reflected in respondents' stated gambling preferences. While both men and women gave high ratings to lotto (38% of males and 40% of women) and gaming machines (19%; 17%) gender differences were evident in the case of lottery/pools/bingo (14%; 25%) and track betting (16%; 6%). Younger, single people, especially men, were found to have stronger preferences for continuous forms of gambling such as racing and gaming machines. In contrast to the participation findings, with respect to preferences, there did not appear to be major preference differences between city and country respondents. Neither income nor ethnic differences were evident.

Of those who gambled, men, on average, reported weekly expenditure slightly double that of women. Overall, country gamblers reported spending more than their city counterparts although this relationship was reversed for those who gambled weekly or more. TAB betters reported having the highest weekly expenditure (mean of approximately A$25 on this form of gambling) followed, in descending order, by totalisator betting (A$17), cards (A$10), and card machines and poker machines (both approximately A$9). Mean reported weekly expenditure for betting with bookmakers, keno, lotto, bingo and casino gambling ranged from A$5 to A$7.

Some attitudinal questions were included in the New South Wales survey. Respondents were almost equally divided on whether or not gambling is an important leisure activity for Australians (40 % agreed; 39% disagreed). Counter to the authors' expectations, women were significantly more likely to agree than men. Also contrary to expectations, less rather than more frequent gamblers tended to agree that gambling is an important leisure activity. Ninety-four percent of respondents agreed (79% strongly) that gambling results in serious problems for some families. Respondents were also asked questions

about their overall financial wellbeing. No relationship was found between levels of reported gambling expenditure and reported financial wellbeing.

The confidence that can be placed in the findings of this survey is compromised by the high refusal rate, especially in the city sample where it was almost 50 percent. This certainly raises doubts about the validity of the city-country comparisons. The report is also lacking in the methodological detail that is required to calculate overall response rates, for example how households were sampled, how contact was made with eligible respondents and what percentage were asked to be interviewed. It also appears that quota sampling was used. This method has serious shortcomings. This said, the survey report actually provided more methodological information than many of the population surveys considered to this point in the review.

South Australia

South Australia, like Victoria, has only recently introduced gaming machines and has subsequently experienced rapid growth in gambling expenditure, almost as rapid as that in Victoria during the 1990s. Prior to the commencement of gaming machine operations in hotels and clubs during mid 1994, South Australians devoted less of their disposable incomes to gambling than any state or territory in Australia, other than Victoria (refer to Table Two). During the year after the introduction of machines, gambling expenditure increased by approximately a third. In 1998 South Australia ranked sixth in terms of adult per capita expenditure, behind Queensland, and ahead of Western Australia and Tasmania (Tasmanian Gaming Commission, 1999.)

The first state-wide survey of gambling in South Australia was conducted in 1995 for the Department of Treasury and Finance (Inquiry into the Impact of Gaming Machines in South Australia, 1995). This was a telephone survey of 1,000 respondents conducted during a single week. As with the first New South Wales studies, it was confined to gaming machine participation. No other methodological details or information regarding the response rate are provided in the summary report. Given the rates obtained in other Australian gambling surveys and the very tight time-frame used in this study, the response rate was probably low.

The 1995 survey report indicated that 40 percent of respondents had played machines in the preceding 12 months; six percent at least once a week and a further ten percent at least once a month. There were no gender differences between non-players and occasional players. Women were somewhat more likely to indicate that they played at least once a month (58% versus 42% for men). People aged 65 years or older, younger adults, people who were not married or living in a steady live-in relationship and those without dependent children appeared to be over represented among people who had participated during the previous year. However, this is uncertain as the data were apparently not adjusted to take account of the relative proportions of these groups within the population. Respondents who participated during the week prior to their interview reported spending, on average, A$21 each in that period.

In this survey, twenty percent of players indicated that they considered the amount they had spent on gaming machines was excessive. A slightly smaller number (18%) said that the source of their money for machine gambling was from savings. Other sources cited, in descending order, were restaurant/ family restaurant meals (15%), expenditure on alcohol in hotels/clubs (9%), cigarette smoking (7%), lotto, keno and scratch tickets (6%), consumption of alcohol at home (5%) and theatre movies and other shows (5%). Ninety-two percent said they played “just for entertainment”. One third said that the most appealing aspect of playing gaming machines was “being with friends and mixing with people”. More than a third of respondents reported that poker machines had made no difference to the attractiveness of clubs and pubs; 18 percent said it had made them better and 31 percent worse.

The only comprehensive South Australian state-wide survey of gambling participation was conducted in 1996 (Delfabbro & Winefield, 1996a; 1996b). This involved telephone interviews with 1,206 residents in both metropolitan and regional areas. Methodologically, the sample design was stronger than that of most other Australian gambling surveys in that it did not use a quota system. Instead, data were

post-weighted according to the probability of selection of respondents within households and further weighted by gender, age and region so that the sample reflected the South Australian population. Up to five household telephone calls and four callbacks were made to contact the randomly selected respondent within each household. However, as with the other Australian surveys, the response rate was very low. Over 30 percent of people contacted refused to be interviewed or terminated the interview prior to completion. Refusal and non-completion rates were much higher for the metropolitan sample. When non-contacts are also taken into account, the overall response rate is approximately 46 percent.

Overall, the 1996 survey found that 79 percent of respondents reported having gambled at least once during the previous 12 months. Of those who gambled, 40 percent did so at least once a week. Nearly two-thirds of these were regular lotto participants. Past year participation rates were highest for lotto (58%), followed by gaming machines (42%), bingo and scratch cards (36%) and horse racing (19%). Other forms, including casinos and other racing and sports betting were engaged in by less than ten percent of the sample. Only five percent of gaming machine and bingo/scratch ticket players and two percent of horse race betters participated in these activities on a weekly basis.

There were no overall gender differences for past year gambling participation or for participation in lotto, video bingo and gaming machines. Males, however, reported significantly higher levels of participation in track and sports betting, casino games and some other relatively infrequent types of gambling. The only gambling form where women significantly outnumbered men was bingo.

Overall participation rates were highest among people aged 25-54 relative to the younger and older groups. However, age differences were not large. The youngest group (18-24 years) was least likely to participate in lotteries but had high rates of participation in video card games and casino games. Gaming machine participation was highest in the 25-34 and 45-54 age groups.

People living outside metropolitan areas were somewhat more likely to report gambling involvement during the past year (83% versus 76%) and to gamble on horses and bingo/scratch tickets.

Using both calculated and perceived estimates, as described in the Victorian studies, gambling expenditure was found to be significantly higher among men, people living in the metropolitan area, among divorced/separated people and those living in de facto relationships. Using the calculated measure, it was estimated that South Australian gamblers spent an average of A$1,007 per year. Forty percent were estimated to spend less than A$100, 45 percent to spend between AS100 and A$1,000, 13 percent between A$1,000 and A$5,000, and approximately three percent to spend A$5,000 or more. Of the most popular gambling activities, lottery gamblers spent on average A$352 per year, gaming machine players A$305, bingo/scratch gamblers A$93 and horse racing gamblers A$933. As with the Victorian research, it was found that the calculated expenditure was higher than perceived expenditure (A$1,007 versus A$413). This suggests that most people underestimate the amount they spend on gambling.

Queensland

Queensland falls between ACT and South Australia in terms of 1998 adult per capita expenditure. During the 1990s Queensland has experienced a high rate of growth in expenditure, similar to that of South Australia and somewhat slower than Victoria. As in the case of Victoria and South Australia, the introduction of gaming machines to clubs and hotels played an important role in this expansion.

Although the literature search did not locate any state-wide studies of gambling in Queensland, reports on some relevant surveys of particular localities were examined. For the most part they focused primarily on gaming machine participation.

In 1991, a survey of gambling and problem gambling was conducted in four Australian cities, namely Adelaide, Brisbane, Melbourne and Sydney (Dickerson, 1992; Dickerson, Baron, Hong & Cottrell, 1996). Although this study obtained gambling participation data from samples of at least 500 for each city, very little information is provided regarding gambling participation other than problem gambling.

Furthermore, there are serious methodological problems with this study that will be discussed in the problem gambling section of this review. Overall, 29 percent of respondents were reported to have participated in lotto only once a week or more; 11 percent "other" (which presumably included casinos and cards), four percent track betting, three percent scratch tickets, two percent poker machines and one percent bingo. Other forms were engaged in weekly or more by less than one percent of respondents (Dickerson et al, 1996). The percentages for the Queensland city of Brisbane were higher than the four city average for lotto (47%), scratch tickets (6%) and pools (3%), and similar for "other" (11%), track betting (5%) and bingo (2%). No participation in poker machines was recorded for Queensland. It should be noted that these percentages differ somewhat from an earlier report on this 1991 study (Dickerson, 1992).

Although no gaming machine participation was reported in the 1991 Brisbane study, an earlier 1984 survey was cited in a report by the Australian Institute for Gambling Research (1995) that apparently found 37 percent of Brisbane respondents played gaming machines. The reason for this discrepancy is not clear. Presumably 1984 respondents played machines in New South Wales. Perhaps they did so less frequently than the weekly time frame used in the 1991 study. Alternatively, machine gambling may have been omitted from the 1991 study because machines were not legal in Brisbane at that time.

Dickerson et al carried out a second Brisbane survey in 1994 (Australian Institute for Gambling Research, 1995), following the introduction of gaming machines. This involved an adult sample of 500. Methodological details and response rates are not available in published accounts. Forty-one percent of respondents reported that they had played a gaming machine in the 12 months prior to the survey and ten percent said they played weekly or more. More males (56%) than females (47%) reported participating in the past 12 months. This gender difference was stronger for respondents who participated at least monthly (74% men).

In this survey, there appeared to be an over-representation of people aged 18-19 years and much lower participation rates among older adult groups. However the small sample sizes reduce the confidence that can be placed in these findings. People in full- or part-time paid employment and students had higher monthly participation rates. Differences were not evident between different income or education groupings. Given the concentration of machines in metropolitan areas, the authors cautioned that these findings should not be generalised to the state as a whole.

Percentages for other major forms of gambling during the past 12 months were: raffles or art unions (75), scratch tickets (71), lotto (61), casket tickets (32), TAB (21) and casino (18). Other forms were reported by less than ten percent of the sample. As in other Australian surveys where comparable data are available, a somewhat different pattern emerged for gamblers who participated at least monthly. Of those who gambled monthly or more, approximately 72% reported participating in lotto. Percentages for other major forms were: scratch tickets (57), pubTAB (47), pools (44), raffles (37), bingo (36), gaming machines and casket tickets (both 32), cards (27) track betting (15) and casino (8).

Some expenditure data were also reported. Each major form of gambling was examined in relation to the percentage of participants who reported spending over A$40 per session. Forty-three percent of casino gamblers reported spending this amount per session. Track betting (26%) ranked next in terms of high expenditure, followed by cards (16%), pubTAB (10%), TAB (8%) and gaming machines (6%). With respect to gaming machines, men were twice as likely as women to be "big spenders", typically spending more than A$40 per session. Given that machines account for the largest percentage of actual (official) gambling expenditure in Queensland and that most reported relatively low levels of machine expenditure in the survey, it is probable that a small percentage of participants spend very large amounts of money. The findings reported for Victoria also make it likely that the machine gamblers significantly under-reported both net and session losses.

Those 1994 survey respondents who had participated in gaming machines were asked what they would have done with their money if they were not spending it on machines. A quarter said they would have spent it on household expenses. A similar number said they would have spent it on entertainment or some other form of gambling. Fifteen percent reported that they would have saved it.

Some attitudinal questions were also included in the Brisbane survey. Slightly over half of respondents agreed that "governments are encouraging people to gamble too much these days". However, only a quarter agreed that "poker machines should never have been introduced into Queensland." Most disagreed or strongly disagreed with this statement. Respondents were almost equally divided on whether or not gaming machines benefit the community and almost all (95%) agreed that machines "should be carefully controlled and regulated".

In 1995, the Australian Institute for Gambling Research (1995) conducted another survey in Queensland. Like the 1994 survey, this involved interviews with 500 Brisbane residents. In addition, samples of 350 each were drawn from two other metropolitan areas within the state, namely Cairns and Rockhampton. Similar questions were asked. Stratified sampling by age and gender was employed. As with the 1994 survey report, very little additional methodological information was provided. Response rates were not given. In contrast to the previous survey, only respondents who indicated that they had participated in gaming machine gambling during the previous 12 months were included in the survey. This focus on current machine gamblers combined with the stratified sampling procedure employed in this survey means that this information cannot be used to provide estimates of gambling participation, including machine gambling, within the general population. Given these limitations, brief mention only is made of the findings.

As with the 1994 Brisbane survey, approximately ten percent of past year machine gamblers reported participating weekly or more. There was little regional variation in this respect. This was generally the case with most other variables considered. Again men were found to have participated slightly more than women in past year machine gambling but they did not differ with respect to average reported expenditure. Respondents over 45 years of age were found to play more often than younger machine gamblers and higher proportions of people on incomes under A$10,000 or who were unemployed or retired reported participating weekly or monthly. Although people in these groups participated more often, on average they spent less than those in other categories. The youngest (18-19 years) and oldest (over 65 years) groups also reported relatively lower levels of expenditure. Only 10 percent of machine gamblers reported spending A$5 or more per week. The overall pattern of responses to questions about alternative uses of gambling money was almost identical to that reported for the 1994 survey. Machine gamblers also gave similar responses to the four attitudinal questions, mentioned above, that had been asked in the 1994 Brisbane survey. Low income, low educational attainment and unemployment appeared to be better predictors of reported financial difficulties than were machine frequency of play and/or expenditure. Approximately twelve percent of machine gamblers indicated that they at least occasionally experienced problems when they gambled. Seven percent said their machine gambling was never problem free.

A small, non-random survey of Australian Aboriginal and Torres States adults has also been published (Australian Institute for Gambling Research & Labour and Industry Research Unit, University of Queensland, 1996). One hundred and twenty-eight respondents were recruited by approaching players in registered clubs and hotels in Cairns and snowballing to friends and relatives. The bias introduced by this sampling procedure is unknown. However, a high probability of bias and the small sample size mean that the findings cannot be generalised beyond the sample. Nearly 80 percent of respondents and equal numbers of men and women preferred gaming machines, followed by lotto/lottery (11%), TAB (7%) and others such as cards and bingo (4%). Men were five times more likely than women to prefer TAB gambling. Average weekly reported expenditure was A$30 on gaming machines and A$60 on all forms of gambling. This represented 20 percent of average respondent income and is substantially higher than that reported in the general population surveys summarised above. Almost a third of respondents indicated that they had not gambled at all prior to the introduction of gaming machines and a substantial minority reported gambling-related problems of various sorts.

Despite the methodological problems, this is one of a very small number of published reports on gambling among indigenous Australians. However, there are major difficulties in using conventional social survey methodologies with any group that makes up a small proportion of the total population and is widely spread geographically. Studies of total communities or snowball methods starting from a more randomly selected base group would, however, provide useful information.

Summing up, it is evident that state-wide information on gambling participation and attitudes towards gambling is lacking for Queensland. The information that is available is partial, generally not adequately presented, and of questionable validity.

Western Australia

Throughout the 1970s, 1980s and first few years of the 1990s, adult per capita gambling expenditure in Western Australia was similar to Queensland. During the early 1990s Western Australia ranked ahead of Victoria, South Australia, Queensland and Tasmania. However, by 1998, Western Australia had the second lowest per capita gambling expenditure, behind South Australia and ahead of lowest ranking Tasmania. In other words, relative to other states and territories, other than Tasmania, gambling expenditure in Western Australia increased slowly throughout the 1990s. In 1990 gambling constituted 2.05 percent of household disposable income. In 1997 it was 2.14 percent. The major reason for this relatively slower growth rate was probably that Western Australia did not introduce gaming machines. Although Western Australia was one of the first states to establish casinos, which have gaming machines, it is the only state or territory that does not have large numbers of machines in clubs and hotels (Tasmanian Gaming Commission, 1999).

The only Western Australian state-wide survey located was undertaken in 1994 by Dickerson, Baron and O'Connor (1994). This was a door knock quota survey of 1,253 adults. As with other Australian surveys, little methodological detail was provided. However, a high refusal rate was noted (39%), raising the possibility that the sample was not representative. Information was not provided on the percentage of households where contact was not established, thus the response rate could not be determined.

Sixty-five percent of the sample indicated that they participated in some form of gambling during the past 12 months. This is low relative to other states. People who gambled reported spending on average, A$17.50 per week. There were no gender or rural-urban differences on overall past year gambling participation rates. The only sociodemographic factors that separated gamblers from non-gamblers appeared to be age and work status. Lower participation rates were found among respondents aged 18-29 years and higher rates were found in all the older age groupings. Respondents in full-time employment also reported higher participation rates than students and those engaged in "home duties." However, when the urban-rural groups were compared, it was found that this relationship, while being strong for urban respondents, was actually reversed for rural people. In other words, in rural parts of the state, respondents not in full-time paid employment were somewhat more likely to gamble than their employed counterparts.

Past year levels of participation in the different forms of gambling were: lotto (47%), scratch tickets (31%), raffles (16%), gift lotto ticket (11%), casino-machines only (7%), off course TAB (6%), casino-tables only (5%), private card games (3%), on course TAB (2%), bookies-horse and dog races (2%), bingo (2%) and TAB by phone (1%). Less than one percent of the sample reported participating in the remaining forms. Major urban-rural differences were found for raffles and casino gambling with rural people more often purchasing raffles and city people more often engaging in casino gambling. As in previous studies, there was a considerable drop-off in participation when shorter time-frames were considered. Percentages participating once a month or more in the more popular forms were: lotto (31), scratch tickets (14), raffles (5), off course TAB (3), gift lotto (2), bingo (1.5) and casino-machines only (1).

Both urban and rural respondents who gambled frequently were more likely to be aged 30 years or older. Rural respondents aged 60 or over reported higher levels of participation than their urban counterparts. Married and widowed people in both urban and rural settings also tended to gamble more frequently. Respondents who gambled more than once a month were less likely to be in full-time employment and more likely to be retired. Other sociodemographic variables (apart from those mentioned and gender) including income level, education and ethnicity were not associated with whether or not respondents gambled more frequently than once a month.

The authors report that a gender difference was found for the sample as a whole, namely "as frequency of gambling and amounts spent increase the probability that the player will be a woman reduces" (p 20). As indicated above, there was no gender difference for past year participation. However, the ratio of males to females for once a month or more frequent gambling was 1:0.86 and for those who gambled once a week or more often 1:0.7. In the latter category, the gender difference was more evident when lotto only and other forms were considered separately. For lotto only it was 1:0.85 and for other forms 1:0.5. Again, rural-urban differences were evident with rural women being somewhat more likely than rural men to report gambling monthly or more often. This difference was related to the further finding that rural people had higher weekly participation in and expenditure on lotto and scratch tickets, which women tend to favour, and much lower participation in and expenditure on track and sports betting and casino gambling.

For rural respondents who gambled once a week or more on lotto and scratch tickets, but not on track betting or at a casino, reported mean weekly overall gambling expenditure was A$51. For their city counterparts it was A$41. For those who gambled weekly or more on other forms of gambling (with or without regular involvement in lotto or scratch ticket gambling), rural respondents reported a weekly average of A$87 compared with A$150 for city respondents. City respondents who gambled regularly also reported spending much more time gambling than rural people who did likewise. The lotto/scratch ticket only group was also found to be much more likely to be married or to live in a marriage-type relationship than those participating frequently in other forms of gambling. Other sociodemographic differences were not evident for respondents who reported gambling weekly or more.

Additional information was obtained from the 16.3 percent of the total sample that reported gambling once a week or more on any form of gambling. This included consideration of effects that the report authors deemed to be positive. These "effects" were items on scales that had been used in earlier New Zealand research (Abbott & Volberg; 1992; 1996a). Differences were found between the lotto/ scratch ticket and the 'other' groups. Items where there was a difference of more than 10 percent between the two groups were as follows:

- winning at gambling has helped me financially (lotto/scratch 13%; other 28%)
- I have won more than I have lost at gambling (19%; 31%)
- I've had a big win from gambling (1%; 14%)
- Gambling has given me something to talk about with family/friends (16%; 68%)
- I have gone gambling with family or friends (28%; 68%)
- Gambling has been a hobby and an interest for me (35%; 70%)
- I am more likely to gamble for celebration (22%; 40%)
- When I was gambling I felt excited (39%; 64%)
- My gambling has been skilful (13%; 35%)
- When I was gambling I felt relaxed (22%; 54%)
- Each time I gambled I expected to win (42%; 59%).

A large majority of both groups reported that they only gambled what they could afford (79%; 87%) and many reported that gambling had given them pleasure and fun (66%: 62%) and that their gambling was problem free (69%; 74%).

This information is of interest in that it provides some insights into the reasons why people gamble and the different types of experience associated with lotto-type gambling and continuous forms of gambling. It suggests the importance of social interaction, particularly with regard to continuous forms of gambling. It also illustrates that many gamblers misperceive their winnings relative to losses and perhaps the role of skill in gambling outcomes. Although indicating a number of positive factors associated with regular gambling and suggesting that for most people gambling is problem free, it also suggests that approximately a third of this group may experience some problems. This will be taken up further in Section Three.

Tasmania

Tasmania was the first state to introduce casinos, located in its two major cities. Throughout most of the 1970s and 1980s this state ranked second after New South Wales in terms of adult per capita gambling expenditure and gambling expenditure as a percentage of total household disposable income. Since the late 1980s, in contrast to other parts of Australia, Tasmania experienced little change in gambling expenditure and in 1998 ranked lowest in per capita expenditure and second lowest (ahead of Western Australia) in gambling expenditure as a percentage of total household disposable income. Tasmania did not introduce gaming machines to venues outside casinos until 1997. During the following 12 months, expenditure increased substantially (Tasmanian Gaming Commission, 1999).

The Australian Institute for Gambling Research conducted state-wide Tasmanian surveys in 1994 and 1996 (Dickerson, Walker & Baron, 1994; Dickerson & Maddern, 1997). The 1994 study was a random door-knock survey of a stratified sample of 1,220 Tasmanian adults. The refusal rate was reported to be 23 percent. Information on the number of households where contact was not established was not provided. The 1996 survey was conducted via telephone interviews with 1,211 adults, whose numbers were randomly selected from telephone directories. Sixteen percent of respondents were apparently not available after four call-backs. It is not clear whether this percentage referred to households that were not contacted and/or to the person sought (the oldest person normally resident aged 18 years or older) not being available. The refusal rate was stated as 5.4 percent. If correct, this would be by far the lowest refusal rate reported in the gambling population survey literature examined in this review. However, it apears that this was a reporting error and that the correct initial refusal rate was 36.3 percent, not 5.4 percent (Ralph Lattimore, 1999 personal communication with first author). As with the other Australian surveys, it is not possible to determine the response rates for either Tasmanian study from the information provided.

Notwithstanding the lack of methodological information, the reports on the Tasmanian surveys probably provide the most detailed accounts of gambling participation and attitudes towards gambling conducted internationally in recent years. Only some of the major findings are reported here.

In 1994, 72 percent of Tasmanian adults reported having participated in some form of gambling during the past year. In 1996, the percentage of participants reporting past year gambling participation increased to 89 percent. Past year participation rates for the major forms of gambling in 1994 and 1996 were as follows: tattslotto (1994, 45%; 1996, 62%), raffles (40%; 75%), instant lottery (22.5%; 55.5%), beer tickets (11%; 20%), casino-machines (9%; 32%), tipping competition (8%; 21%), off-course TAB (7%; 17%), bingo (5%; 5%), casino-table games (4%; 12%) and TAB by phone (2.5%; 3%).

The authors of the 1996 report did not comment on these differences. If correct, they indicate a substantial, across the board increase in gambling participation from 1994 to 1996. However, official gambling expenditure figures do not suggest an increase of this magnitude. This raises questions about the comparability of the samples used in the two surveys and/or the way in which people respond to questions in telephone and face-to-face surveys.

A very different pattern emerges for monthly or more recent participation. Monthly participation was reported for the major forms of gambling as follows: tattslotto (1994, 40.5%; 1996, 36%), raffles (26%; 27%), instant lottery (18.5%; 18%), beer tickets (8%; 9%), casino-machines (3.5%; 5%), tipping competitions (8%; 12%) and off-course TAB (6%; 7%). Keno was introduced at the end of 1994. In the 1994 survey, the monthly or more recent rate was one percent. In 1996, casino keno was 3.6 percent and club keno 8.4 percent.

These figures suggest that regular gambling participation rates dropped slightly from 1994 to 1996 for tattslotto, increased for keno and possibly for tipping competitions, and remained much the same for the other more common forms of gambling. The number of total respondents reporting regular weekly or more frequent participation in tattslotto (and no other form of gambling on a weekly basis) or in one or more of the continuous forms of gambling (e.g. track and sport betting, casino gambling, keno and bingo) did not change appreciably from 1994 to 1996. The monthly and weekly findings are more

consistent with expectations but leave unanswered why such an apparent discrepancy was found for the past year participation rates.

In the 1996 survey, participation rates for those who gambled monthly or more often, for all types of casino games, were significantly higher for city respondents. For most other forms of gambling, including tattslotto, bingo, raffles, instant lotteries, tipping competitions, mystery tickets and on- and off-course betting, rates were higher for country respondents.

Women reported higher overall participation rates in tattslotto, raffles and instant lotteries. Men were more likely than women to participate in off-course TAB betting and purchase beer tickets. Significant gender differences were not evident for other major forms of gambling although generally men were over-represented among weekly or more frequent participants in continuous forms of gambling. With the exception of bingo, raffles and gaming machines, men reported higher average expenditure on any one occasion than women.

Age and income groups had somewhat different patterns of gambling participation although there were no significant estimated mean differences in expenditure per session by age for any type of gambling. Overall levels of reported expenditure per session appeared to increase substantially from 1994 to 1996 for a number of forms of gambling. For example, in 1994 no sports betting respondents indicated that they spent, on average, over A$51 per session. In 1996, 25 percent reported spending at this level. Respondents who bet through bookmakers, on- and off-course TAB were also more likely to report higher levels of expenditure in 1996. However, this trend did not apply to casino gambling.

Respondents were also less likely in 1996 to report session expenditure in the smallest (A$5) response category for the most popular forms of gambling including tattslotto and raffles. As indicated above, this is inconsistent with the relatively stable official Tasmanian expenditure figures between 1994 and 1996. The report authors considered it likely that the change may have occurred as a result of the change from door-knock to telephone interviewing and suggested further that “it may be easier for respondents to more honestly nominate figures of expenditure over the phone than face-to-face” (p.53). They do not mention the possibility of different samples arising from the two methodologies with fewer regular heavy gamblers and/or problem gamblers in the 1994 survey.

Respondents in full-time paid work compared with those not employed were more likely to participate in raffles, beer tickets, tipping competitions, off-course TAB betting and club keno. The only form of gambling where people outside the paid workforce were more likely to participate was bingo. Older women were over-represented among regular bingo players.

People with partners but no children were significantly more likely to participate regularly in tattslotto, and engage in machine gambling monthly or more.

As with the Western Australian survey, the 1994 survey found that respondents who participated weekly or more in continuous forms of gambling including track and sports betting, machine gambling and bingo reported higher levels of positive effects such as relaxation, excitement, fun and pleasure. Seventy-five percent of weekly or more participants considered their gambling to be problem free in 1994. These questions were not repeated in the 1996 survey.

In both surveys, respondents were asked whether gambling was an important leisure activity for Australians. Forty-three percent of respondents agreed with this statement in 1994 and 46 percent in 1996. Given the sample sizes and likely margins of error this apparent increase is probably not significant. Men agreed with this statement more frequently than women in both surveys. Urban-rural differences did not appear to be significant. Eighteen percent of respondents agreed that “poker machines will benefit the community” and 93 percent agreed that “poker machines should be carefully controlled” - in both 1994 and 1996. In the 1996 survey, 27 percent of respondents said they intended to play gaming machines in clubs and hotels when they were introduced in 1997.

Northern Territory and Australian Capital Territory

These two jurisdictions came next to Tasmania in terms of per capita gambling expenditure throughout most of the 1970s and 1980s. During the last few years of the 1980's Northern Territory surpassed Tasmania and ranked second behind New South Wales. During the 1990s, expenditure increased rapidly in both territories. In 1998 Northern Territory had the third highest per capita expenditure, just behind New South Wales and Victoria, and the Australian Capital Territory had the fourth highest ranking. Northern Territory, with a population of approximately 178,000, has two casinos. In 1996 it introduced gaming machines and keno to clubs and hotels.

No territory-wide surveys of gambling expenditure were located for either jurisdiction, both of which have small populations relative to the Australian states. Although surveys have apparently not been conducted, there is some information on Aboriginals from an observational study of casino gambling in Northern Territory. While making up only about one percent of the Australian population, indigenous Australians represent over a quarter of the total Northern Territory population. Given the dearth of information on gambling for this group, the findings of this study are briefly described.

Foote (1996b) unobtrusively observed participants at the Darwin casino for a two week period in 1996. Aboriginal attendance was strongly linked to income days. Specifically, high attendance followed one day after welfare and public service payment dates. Low attendance was recorded mid way between pay days. These fluctuations were much greater than those observed for participants generally. Aboriginal attendance in each of four casino 'zones' (namely roulette, keno, blackjack and poker machines), was recorded throughout the observation period. From this study it was evident that significant numbers of Aboriginal people in Darwin are engaged in casino gambling. The great majority, especially women, favoured poker machines. However, more Aboriginal women than men were also observed in the other three casino gambling zones. Their attendance also fluctuated less than men's.

Foote (1996b) commented that a 'traditional' Aboriginal card ring was underway during the period of the casino study and that variations in participation in this activity also appeared to coincide with casino attendance and income days. Card games, usually involving gambling, appear to have been widespread throughout Australian Aboriginal communities for many years. The card ring is described as "…an acceptable and important form of social interaction, recreation and resource distribution" (Foote, 1996a, p.183). The study just described suggests that Aboriginals are moving away from traditional patterns of gambling and/or augmenting them with mainstream gambling.

Conclusion

The recent Australian adult trends and patterns of gambling participation presented in this section seem to be similar to trends and patterns identified in North American studies, especially surveys undertaken in the North Eastern region of the United States and in Canada. Urban-rural differences in participation were an interesting feature of some Australian surveys, albeit that differential response rates complicate their interpretation.

There appear to be no published Australian gambling surveys specifically focused on youth. However, adult surveys that included older teens and young adults obtained results that appear broadly similar to those of studies from North America and the United Kingdom. Some concerns regarding the methodology and reporting of Australian surveys were discussed. The small sample sizes of most surveys and low response rates preclude detailed examination of subgroups within the population. This was also a limitation of most North American studies.

While noting regional variations within the United States, attitudes towards gambling are generally more positive and accepting in Australia. However, as in many other countries that have experienced a rapid expansion of gambling, there are indications of recent increases in concern about actual and/or perceived adverse impacts. In some states this has led to limits being placed on some aspects of further expansion and/or to the commissioning of research on economic and social impacts and formal reviews of gambling policy.

In 1998 the Australian Prime Minister made a public statement expressing concerns about gambling growth. This statement was associated with the announcement of a 12-month public inquiry into Australia's gambling industries and their economic and social impacts across the country. This inquiry is being conducted by the Australian Productivity Commission, the Federal Government's principal microeconomic research and advisory group. It will issue its final report in November 1999. A substantial number of written submissions have been received. The Commission has posted these submissions on its website (www.pc.gov.au). Examination of these submissions indicates that a very wide range of professional and community organisations are of the view that the increased availability of some types of gambling, particularly gaming machines and some other continuous forms, has led to significant problems for individuals, families and wider society. Some call for a hold on any further expansion and many seek the strengthening of measures deemed likely to mitigate adverse effects.

New Zealand

Introduction

As discussed earlier, the development of gambling in New Zealand has many parallels with Australia, albeit that overall levels of expenditure have been significantly lower.

National Expenditure and Turnover

During the 1970s and most of the 1980s, the major forms of legal gambling were largely confined to on- and off-course betting on horse and dog races and the state lottery, Golden Kiwi. Significant numbers of people also engaged in housie (bingo), charitable raffles (lotteries), prize competitions and a variety of other forms of gambling, both legal and illegal. Track betting accounted for the great majority of gambling expenditure, probably 70 to 80 percent, with the remainder split approximately evenly between Golden Kiwi and the remaining miscellaneous group. Throughout this period, inflation adjusted expenditure on legal gambling in New Zealand remained fairly constant, other than from 1984 to 1987 when it decreased slightly. In most years, gambling expenditure made up slightly less than one percent of total household expenditure (Department of Internal Affairs, 1990).

In 1987 the Lotteries Commission introduced Lotto. Instant Kiwi (an instant scratch lottery) was added in 1989, the same year that Golden Kiwi ceased. Gaming machines were also legalised in clubs and hotels during 1988 although at the time of legalisation, approximately 8,000 were already operating, for the most part illegally and for corporate or private profit (Department of Internal Affairs, 1995a). The introduction of these new forms of gambling coincided with a substantial increase in gambling expenditure. From 1987 to 1990, expenditure grew by 34 percent per annum, more than doubling for the three year period. For the 1989/1990 year, legal gambling expenditure totalled approximately NZ$557 million and constituted 1.5 percent of household expenditure (Department of Internal Affairs, 1990).

Since 1990, additional forms of gambling have been introduced. In 1993 the TAB established a national television channel dedicated to track racing in conjunction with facilities for telephone betting. It also introduced sports betting in 1996. New Zealand's first casino was opened in Christchurch during 1994, followed by Auckland in 1996. The Lotteries Commission also introduced additional forms of gambling including daily television keno and telebingo. In the case of keno, only the results are televised. During this period, gaming machines also significantly increased in number throughout the country and clubs and hotels have been permitted to have more machines per venue. Competition between the various forms of gambling led to a marked increase in advertising during the 1990s.

In 1997, legal gambling turnover totalled approximately NZ$6.5 billion. Ten years earlier, in 1987, it was NZ$1.07 billion. Net expenditure for these years for major forms of gambling was respectively NZ$998 million and NZ$249 million, an increase of four hundred percent. In contrast to 1987, when track betting dominated other forms of gambling, in 1997 expenditure was spread fairly evenly across the four major categories. Specifically, expenditure on Lottery Commission products was NZ$285 million, casinos NZ$241 million, gaming machines NZ$230 million and the TAB (track and sports

betting) NZ$242 million (Department of Internal Affairs, 1999).

In 1995, gambling expenditure patterns in New Zealand were compared with comparable information from Australia (Department of Internal Affairs, 1995a). In Australia, gaming machines dominated the market and in New Zealand also ranked first but accounted for a much smaller percentage of the total (38% of total gambling expenditure in New Zealand and 61% in Australia). Track betting ranked second (36% in New Zealand; 23% in Australia), followed by casinos in Australia (8%), lotto (19% New Zealand; 4% Australia), instant lotteries (5% New Zealand; 1% Australia), keno in Australia (1%) and other forms (2% New Zealand; 1% Australia). Since 1994, as indicated above, New Zealand has also introduced casinos and keno. From the figures in the preceding paragraph, it is evident that the relative mix of expenditure has changed markedly. In 1997, the corresponding New Zealand and Australian figures for the major gambling categories are lotto and instant lotteries (29% New Zealand; 13% Australia), casinos (24%; 19%), gaming machines (23%; 49%) and track betting (24%; 17%). Although now more similar to Australia, New Zealand differs in that lotteries rank first in that country and fourth in Australia and gaming machines don't dominate the New Zealand market.

In 1994 per capita gambling turnover in New Zealand was slightly more than a quarter of Australia's (Department of Internal Affairs, 1995a). Very high levels of expenditure in the populous states of New South Wales and Victoria inflate the overall Australian figures. However, per capita turnover in New Zealand was less than a third to a half of that of lower ranking Western Australia, South Australia and Queensland.

National Surveys

There have been five national surveys of adult gambling participation and attitudes towards gambling in New Zealand and a more recent survey confined to Auckland and Christchurch. The Department of Internal Affairs conducted three of these surveys, using similar methodologies and questionnaires, in 1985, 1990 and 1995 (Wither, 1987; Christoffel, 1992; Reid & Searle, 1996). Randomly selected samples of people aged 15 and over in private households were interviewed face-to-face by market research company interviewers (AGB McNair Ltd in 1985 and 1990: National Research Bureau in 1995). The sample size was 1,500 in 1985 and 1,200 in both 1990 and 1995. Response rates are not provided in the 1990 and 1995 survey reports. The results were weighted by age, gender and household size prior to presentation and analysis.

The DIA Surveys: Participation and Expenditure

Given the close similarities in methodology and content, findings from these surveys are considered together.

In 1985, 85 percent of respondents indicated that they had participated in at least one form of gambling during the 12 months prior to the survey. In both 1990 and 1995, 90 percent reported participating within this timeframe. The number of different gambling activities engaged in during the past 12 months increased from 1985 to 1990 and held at the 1990 level in 1995. In 1985, 15 percent of respondents reported participating in four or more activities. This rose to 40 percent in 1990 and 41 percent in 1995. Only very slight gender differences were evident in terms of number of activities engaged in.

In the 1990 and 1995 surveys older participants, especially those aged 65 years and over, participated in fewer activities. In both 1990 and 1995 Mäori were somewhat more likely than non- Mäori to have participated in a higher number of activities. In these two surveys, respondents on low household and personal incomes were more likely to have been non-gamblers during the preceding 12 months. People on low and medium incomes were also more likely to report participating in between one to three types of gambling. In the 1990 survey, retired respondents had the highest non-participation rates (18%). In 1995 students (18%) and beneficiaries (15%) had the highest non-participation rates, although retired people and those engaged in 'home duties' were over-represented among respondents participating in only one to three activities.

Religion was examined in relation to participation in the 1990 survey. Generally, practising members of their religion were found to have substantially lower gambling participation rates than those who indicated that they were not practising or had no religion. However, Roman Catholics, relative to respondents of other faiths or those of no religion, were more likely to take part in gambling activities.

In 1985 reported past 12 month participation was highest for raffles and lottery tickets (71%) and remained high in 1990 (62%) and 1995 (67%). Lotto, introduced in 1987, displaced raffles in 1990 (78%) and 1995 (80%) as the top ranking form of gambling. Track betting was the second ranking activity in 1985 (25%) and was engaged in by 23 percent of respondents in both the 1990 and 1995 surveys. However, in 1990 track betting ranked fifth equal and in 1995, sixth. In the latter surveys, this relative decline was largely attributable to the popularity of new forms of gambling, namely Instant Kiwi and other instant lotteries (66% in 1990; 58% in 1995) and gaming machines outside casinos (28%; 24%). Informal betting with friends and others also played a role (1985, 19%; 1990, 23%; 1995, 30%). Daily Keno, which was introduced just three months prior to the 1995 survey, was participated in by 11 percent of respondents. Other new forms of gambling, namely casinos (6%) and 0900 telephone games (4%) were engaged in less frequently. Other lower ranking forms of gambling in 1995, in descending order, were attending a 'gaming or casino evening' (10%), cards (9%), housie (6%), dice games (3%) and football pools (2%). Participation in this latter group of activities appeared to change little across the three surveys.

The findings summarised in the preceding two paragraphs strongly suggest that the introduction of new, popular forms of gambling did not lead to a reduction in participation in existing activities and, in the case of cards, was associated with increased involvement.

In the surveys where applicable (i.e. when the forms of gambling were available), men were more likely than women to have played gaming machines and made bets with friends. Women were more likely to have participated in housie and purchased Instant Kiwi tickets. Similarly, people aged 15-24 (43% in 1995) were much more likely to have played gaming machines than other age groups. Mäori, relative to non-Mäori, reported much higher participation in housie, gaming machines and Daily Keno. Participation also generally increased with income, especially for bets with friends and track betting, but also for gaming machines, Instant Kiwi, raffles and gaming/casino evenings. Only Daily Keno and housie had higher participation rates among low income respondents.

Occupational and educational differences were also found for some activities. Higher occupational status groups were more likely to participate in Lotto, Instant Kiwi, raffles, track betting and casinos; lower occupational groups in cards and football pools. Beneficiaries had higher participation than other categories in Daily Keno and respondents engaged in 'home duties' in housie. Students were over-represented among gaming machine participants. From 1990 to 1995 beneficiaries' participation decreased across a number of gambling activities. Unemployed respondents were not separated from other recipients of state benefits in these surveys.

Generally, there was little variation across the three geographical regions considered (South Island, Central and Northern). However, in 1995, 11 percent of South Islanders reported having participated in casino gambling compared with five percent for the country as a whole. This was expected given that at the time the only casino was located in the major South Island city of Christchurch. On the other hand, making bets with friends was much less frequently reported in the South Island relative to the other two regions. Urban-rural or other possible geographical divisions were not considered, presumably because of the relatively small sample size.

As with the Australian studies reported above, much smaller numbers of respondents reported gambling on a regular basis. For most activities, other than Lotto, ten percent or fewer of all respondents took part weekly or more. Monthly or more frequent participation levels in 1995 for the total sample were: Lotto (55%), Instant Kiwi (31%), raffles/lotteries (19%), gaming machines (9%), track betting (7%), Daily Keno (4%) and housie (3%). Weekly or more frequent participation levels were Lotto (35%), Instant Kiwi (10%), raffles/lotteries (5%), gaming machines (3%), track betting (3%), Daily Keno (2%)

and housie (2%). Other than Instant Kiwi which appeared to evidence some reduction in participation from 1990 to 1995, once introduced, other forms of gambling appeared to change little across surveys.

The 1990 and 1995 survey reports contained detailed sections on gambling expenditure. The authors cautioned that their expenditure estimates were calculated from reported amounts spent and the frequency of participation in the various gambling activities. They further noted that actual levels of expenditure are likely to be much higher than the reported estimates but that the latter do nevertheless provide an indication of trends over time. For example, in 1994, 'official' New Zealand per capita gambling turnover was NZ$974, more than double the 1990 and 1995 survey expenditure estimates. Reasons for differences between the various indices of gambling expenditure were discussed previously in relation to the Australian survey data.

Overall estimated expenditure changed little between 1990 and 1995. In 1990 mean respondent expenditure was NZ$446 and, in 1995, NZ$413. In both years, 45 percent of respondents said they spent NZ$100 or less in the past 12 months, 22 to 24 percent between NZ$101 and NZ$300, and 12 percent between NZ$301 and NZ$500. In contrast to the lower spending groups, there appeared to have been an increase in the highest categories. In 1990, 16 percent of respondents were in the NZ$501 and over category. In 1995, 22 percent were in this category. Some caution is required here however as the percentages do not add up to 100 in either year, presumably due to rounding. Nevertheless, it would seem that there was a slight drop in overall self reported gambling expenditure from 1990 to 1995. At the same time that average expenditure decreased slightly, there are indications that there was an increase in the number who spent large amounts. In contrast to the trend from these survey data, 'actual' (official) gambling expenditure increased substantially from 1990 to 1995. It is not known why this increase was not reflected in the survey estimates.

Estimated mean expenditure was higher for men than women in both 1990 and 1995 (NZ$528 versus NZ$367 in 1990; NZ$507 versus NZ$322 in 1995). Mäori estimated expenditure was approximately double non-Mäori (NZ$912 versus NZ$407 in 1990; NZ$686 versus NZ$376 in 1995). There appears to have been a significant reduction in Mäori mean estimated expenditure from 1990 to 1995 although caution is required in making this inference given the small sample sizes and the effect that one or two extreme cases can have on the mean estimates. In both surveys the oldest (65 years plus) age category had lower estimated expenditure than other categories. In 1995, the youngest (15-24 years) group also had lower expenditure. Average spending on gambling per annum increased with personal and family incomes. While expenditure dropped to varying degrees in the middle and upper income groups from 1990 to 1995, it remained unchanged for the lowest income groups. In contrast, in 1990, beneficiaries and lower occupational status workers had substantially higher expenditure than other occupational groups. However in the following survey, both dropped considerably, although they still remained in the top three of the six expenditure groups.

Respondents without formal educational qualifications reported spending considerably more than others, especially in 1990. In 1995, average expenditure for this group dropped from the 1990 mean of NZ$675 to NZ$532. While still the highest spending group, in 1995 it was only slightly ahead of the next group, namely people with the lowest level of educational qualifications who were estimated to spend an average of NZ$475. In 1990, South Island respondents had a mean estimated expenditure of NZ$581. This dropped to NZ$385 in 1995. The other two regional groupings appeared to have increased slightly during this same period and in 1995, average expenditure for the three regions ranged from NZ$385 to NZ$442.

The 1990 data on reported gambling expenditure among different religious groups was generally consistent with the participation findings mentioned above. Specifically, Roman Catholics reported spending on average approximately double that of the other religious groups including respondents without a religion. These non-Catholic groups had very similar levels of expenditure.

Estimated mean expenditure was also calculated for each of the major forms of gambling. 1990 and 1995 mean expenditures were as follows: track betting (1990, NZ$146; 1995, NZ$58), Lotto (NZ$131; NZ$161), Instant Kiwi (NZ$56; NZ$46), housie (NZ$52; NZ$27), gaming machines (NZ$37; NZ$24) and raffles (NZ$25; NZ$28). In 1995, one respondent with very high expenditure on track betting was

excluded from the expenditure calculations. Mean expenditures for additional activities included in the 1995 survey were Daily Keno NZ$9; casinos NZ$42; and 0900 telephone games NZ$8. The Christchurch casino had only been in operation for part of the year prior to the survey and Daily Keno had operated for just three of the preceding 12 months.

Substantial differences in estimated expenditure on particular forms of gambling were found between some sociodemographic groups.

Track betting expenditure was much higher for men than women in both 1990 and 1995. Mäori, respondents with higher incomes, employed people and those aged between 25 and 64 years also generally reported higher expenditure on track betting.

With respect to Lotto, men, Mäori, respondents aged 45 to 54 years, those with higher incomes, employed people and those with no or fewer formal educational qualifications all reported higher expenditure. The youngest and oldest age groups reported low expenditure. The same pattern was found for both surveys.

The younger age groups (15 to 34 years), especially in the 1995 survey, and Mäori reported high levels of expenditure on Instant Kiwi relative to other groups. Men and respondents with lower levels of educational qualifications also reported somewhat higher expenditure. In the 1990 survey, beneficiaries and people without educational qualifications also reported high levels of expenditure. However, these differences were less evident in 1995.

Mäori, women and respondents on low or middle incomes, engaged in 'home duties' and having none or lower level educational qualifications spent substantially more on housie than other groups. The age distribution of expenditure appeared to be quite complex and differed between the two surveys.

In both surveys men and non-Mäori reported higher expenditure on gaming machines. In 1990, the youngest group reported average expenditure double that of any other age group. However, this was reversed in 1995 with the youngest group reporting the lowest expenditure and the oldest group the highest expenditure. A somewhat similar finding applied to income and educational level. In 1990 those on high incomes reported the lowest expenditure. In 1995 this group reported the highest expenditure - three times that of the next group. In relation to education, people without qualifications had the highest level and spent more than other groups in 1990. However, in 1995 their expenditure was similar to that of university graduates, the lowest spending group. Similarly in 1990, beneficiaries, of the various occupational groups, had by far the highest expenditure. In 1995 they ranked third after retired respondents and those in the upper occupational groups.

These data suggest a substantial change in the expenditure profile of gaming machine participants. However, given the small samples in many of the groups and thus likely wide margins of error in both surveys, these findings must be considered with caution. In addition, in this situation, very high expenditure by a few respondents can greatly affect the mean scores. Medians would be expected to provide a more stable estimate if a single descriptive statistical index is used. Ideally means, medians and standard deviations should be presented. Given that comparisons are being made between two samples and variance or error terms need to be considered for both, it is highly likely that very large mean or median differences would be required to produce statistically significant differences. Tests of significance were not reported for any of the comparisons referred to in the reports.

With respect to raffles, Mäori reported substantially higher expenditure than non-Mäori in 1990 and 1995. Males also reported higher expenditure in both surveys. While there were some variations in expenditure by age in 1990, in 1995 estimated raffle expenditure was similar across all age groups. Middle and higher income groups reported somewhat higher expenditure in both surveys. University and other tertiary qualified respondents appeared to spend somewhat less than the other educational groupings. In 1990, beneficiaries had the highest expenditure of the occupational groups. However, in 1995, lower occupational status workers ranked first and beneficiaries reported spending considerably less, although they still ranked second equal with the higher occupational status respondents.

Mäori reported that they spent four times as much as non-Mäori on Daily Keno in 1995. People aged under 35 and between 45 and 54, those in middle and upper income categories, students and respondents with higher secondary school qualifications also reported spending somewhat more than other groups.

Males and Mäori both reported expenditure more than three times that of women and non-Mäori respectively on casino gambling. However, the very small Mäori sample size means that this apparent ethnic difference should be treated with caution. Respondents aged under 35 years, those in the lowest income group, lower occupational status workers and people with lower level secondary school qualifications also reported relatively higher expenditure.

Information was also provided on 0900 telephone games but the sample was very small and is not commented on here because it is unlikely to be reliable.

Other Relevant National Survey Findings

In Section One, mention was made of the importance of triangulation in increasing confidence in research findings, particularly when the phenomena under investigation are complex and difficult to assess definitively in any single investigation. While not gambling studies per se, two other national surveys, one conducted at about the same time as the 1990 Department of Internal Affairs survey and the other at about the time of the 1995 survey, contained some items on aspects of gambling. These surveys, namely the Department of Statistics Household Expenditure and Income Survey (HEIS) (Department of Statistics, 1990) and Household Economic Survey (HES) (Department of Statistics,1995), both involved large, nationally representative samples. They achieved high response rates and were generally more sound methodologically than any other survey referred to in this review. Both employed face-to-face interviews. The 1994/1995 HES survey also involved respondents keeping a diary of expenditure for a period of two weeks. Participation in and expenditure on Lotto was included.

Twenty-eight percent of HES respondents recorded having purchased a Lotto ticket in the two week diary period, slightly less than the 35 percent who said they bought tickets every week in the 1995 survey summarised above. Whereas men were somewhat more likely than women to report regularly buying Lotto tickets in the 1995 DIA survey, no gender difference was evident in the HES. The latter survey also found that New Zealanders of European descent were somewhat more likely than Mäori to have bought a ticket. With respect to age and income, the findings of the HES and 1995 DIA surveys were generally comparable. Although the HES used different and more fine-grained occupational categories, the findings were generally consistent with those of the 1995 DIA survey. In both surveys, retired respondents were more likely to have purchased tickets than those in other occupational groups.

Estimated mean Lotto annual expenditure based on the HES (NZ$96) data was somewhat lower than that of the 1995 DIA survey (NZ$163). However, these surveys obtained similar results for Lotto expenditure by gender, age, income and education level. With respect to ethnicity, the 1990 DIA and HEIS surveys both found that Mäori reported spending more on Lotto than non-Mäori. But, whereas the 1995 DIA survey also found higher Mäori expenditure, the 1994/1995 HES did not find a difference between these groups. However, it did find that Pacific Islanders spent more. The 1995 DIA survey's sample size was not sufficiently large to consider Pacific Islanders separately and they were included in the non-Mäori category. Whereas the 1990 and 1995 DIA surveys found lower status workers had higher Lotto expenditure than the other occupational groups, the more fine-grained HES classification found that 'legislators/administrators/managers' recorded the highest expenditure, followed by clerical and assembly line workers.

Two further national surveys also provide relevant information. Both focused on problem and pathological gambling but included sections on gambling participation and expenditure. In contrast to the other New Zealand studies mentioned to this point, respondents were recruited and interviewed by telephone. The first was conducted in 1991 (Abbott & Volberg, 1991; 1992; 1996a; Volberg & Abbott, 1994). Some of the participation findings are also summarised in the Department of Internal Affairs report on its 1990 survey (Christoffel, 1992). The second was conducted by North Health in 1996.

As mentioned at the outset of the New Zealand section, an additional survey, limited to Christchurch and Auckland, also has some relevance. This survey was also conducted via telephone and was undertaken during 1997 (Australian Institute for Gambling Research, 1998).

The findings from these telephone surveys will be discussed shortly, following consideration of some of the other findings from the Department of Internal Affairs reports that are relevant to this review.

The DIA Surveys: Reasons for Gambling and Attitudes Towards Gambling

In addition to seeking information about gambling participation and expenditure, the three Department of Internal Affairs surveys asked respondents to indicate their reasons for gambling from a list and assessed their attitudes towards some aspects of gambling. Across the three surveys and almost all forms of gambling, "to win prizes/money" was the reason most frequently given for respondent participation. The exception was raffles where the great majority of respondents said they participated to support worthy causes. Excitement and challenge was also important for track betting, gaming machines and casinos. In the 1995 survey, curiosity was mentioned frequently for casinos, Daily Keno and 0900 games, all of which had been recently introduced. In the case of housie, "to be with people/ get out of the house" was the second most frequently mentioned reason.

Respondents were also asked why they did not participate in each of the various forms of gambling. Across the three surveys and all types of gambling, lack of interest was by far the most frequently expressed reason, followed by "a waste of time/money". About a quarter of 1990 and 1995 respondents gave moral or religious reasons for not participating in Lotto. A minority (varying from 6% to 17%) also gave this as a reason for not participating in the other forms of gambling.

In all three surveys, respondents were shown a list of gambling activities, both legal and illegal, and asked to indicate which, if any, they considered socially undesirable. In 1995, two-thirds considered 0900 telephone games to be undesirable. Just over a third regarded casinos, gaming machines, sports betting and overseas lotteries as socially undesirable. A slightly smaller number had similar concerns about football pools and TAB race betting. The number indicating that none of the activities listed were socially undesirable fell on each of the occasions the survey was conducted.

A large majority of respondents (varying between 75% to 97%) indicated that government regulations should control who can run gambling activities, the minimum age for participation and the proportion of gaming income which must be returned in prizes. Agreement with these statements relating to gambling regulation increased across the three surveys. A minority (23% in 1985 and 35% in 1995) agreed that government should control the amount each individual can spend on a gambling activity. In 1995, respondents were also asked whether regulation should cover where gaming activities are located and the total amount of gaming available to the public. Over 70 percent responded in the affirmative to these questions. Approximately two-thirds agreed that gambling activities should be "specially regulated" rather than "regulated like other activities". The most often mentioned, unprompted, reasons given for regulating gambling were "to prevent criminal activity", "to make sure profits fund worthy causes", "to protect people who could be harmed" and "to make sure gaming is run fairly."

Respondents were also asked if there should be less or more restrictive controls over a variety of gambling activities and whether any should be made illegal. Between 40 and 65 percent of respondents agreed with current levels of control for most gambling activities that were legal at the time they were surveyed. However a substantial minority (varying between 32% and 48% in 1995) sought more control for track betting, gaming machines, casino betting, sales promotions and 0900 telephone games. Support for more control increased for most activities from 1990 to 1995, especially for sales promotions, track betting and gaming machines. Support for less control also increased for many activities, particularly housie, social casino evenings and raffles. These findings suggest an increasing polarisation in public opinion and a separation in perceptions regarding different forms of gambling, perhaps related to beliefs about their varying potential to lead to social problems.

With regard to profits from gambling, 94 percent agreed that they should be used for "worthy" causes.

A significant majority was opposed to gambling profits being used as a source of government revenue or corporate profit. These attitudes appeared stable from 1990 to 1995. A majority in 1995 (73%) agreed that the advertising of gambling should be permitted.

Respondents were shown a list of activities illegal at the time they were interviewed and asked which should be legalised. Approximately half, unprompted, said none should be. About a third favoured legalising sports betting and overseas lotteries and a fifth considered that betting with bookmakers on track races or other events should be legalised. In 1995 interviewees were also asked how many casinos there should be in New Zealand. Approximately equal numbers said none, two or more than two. At that time one casino was operating and another was under construction.

Another section of the survey questionnaires addressed problem gambling. Steadily increasing numbers agreed or strongly agreed that there is a problem in New Zealand with people being heavily involved in gambling (66% in 1985, 71% in 1990 and 77% in 1995). Those in the 'don't know' category decreased from 20 percent in 1985 to five percent in 1995. Ninety-seven percent agreed or strongly agreed that special help should be made available for people who want to give up gambling - an increase from 65 percent in 1985 and 91 percent in 1990. In 1995, the majority (74%) said the gaming industry should provide the funding for this, through a tax or levy. Thirty percent said government should provide the funds and 25 percent said gamblers themselves.

The 1991 National Survey

Methodology

The 1991 Problem Gambling National Survey, like the three studies described above, was commissioned by the Department of Internal Affairs. This survey was conducted in two phases. In the first phase, 4,053 New Zealanders, aged 18 years and over, were interviewed by telephone. A form of random digit dialling was used to pick up households with unlisted telephone numbers. Within households, the person with the next birthday was selected for interview. Up to eight calls were made to each household, five to establish contact and three to the eligible resident if necessary. A similar method was used to select a supplemental sample of Mäori and Pacific Islanders. An ethnicity question was asked immediately after the eligible respondent was contacted and if this person was a Mäori or Pacific Islander, he or she was asked for an interview. One hundred and twenty such respondents were included. Combined with Mäori and Pacific Islanders picked up from the main sample, the totals almost reached expected proportions within the overall population. Interviewees were given the option of being interviewed in a language other than English.

The phase one response rate, defined as the percentage of those contacted who agreed to participate and who subsequently completed the questionnaire, was 66 percent. A further seven percent of total numbers called consisted of no replies or respondent unavailability after the maximum number of calls. The strictest definition of response rate would include this group as well, or a percentage of them based on an estimate of those who might have been eligible if contacted. In the achieved sample, people aged 18 to 24 years, males, Mäori and Pacific Islanders were somewhat under-represented and some other groups slightly over-represented. Consequently, the sample was weighted for age, gender and household size. The latter weighting was conducted to correct for bias introduced by interviewing only one person per household.

Interviewees were administered a questionnaire that had been cognitively pre-tested and piloted. This questionnaire included a section covering gambling participation and expenditure, a revised version of the South Oaks Gambling Screen (SOGS-R) to provide a measure of both current and life-time problem and probable pathological gambling, and a series of sociodemographic questions. Consideration here is confined to data obtained from responses to the first and last sections. The problem gambling data will be discussed in Section Three.

The second phase of the 1991 survey involved in-depth, face-to-face interviews with a sub-sample of 217 phase one respondents. The sub-sample consisted of life-time problem and probable pathological

gamblers identified by the SOGS-R and randomly selected groups of frequent continuous and non-continuous gamblers. Response rates ranged from 84 percent for probable pathological gamblers to 68 percent for problem gamblers.

The phase two questionnaire included more detailed questions concerning recent gambling participation, expenditure and reasons for gambling and a series of questions designed to obtain interviewee accounts of gambling involvement and changes in gambling behaviour at various stages of their life. It also included the piloting of six new scales developed by Mark Dickerson to assess perceived benefits and costs related to gambling, a section on help-seeking and a series of psychometric scales to assess minor mental disorder, clinical depression and alcohol consumption and problems.

Following each interview, interviewers were also required to complete an assessment, based on their overall impression of interviewee responses and their own observations, using a checklist of current (DSM–III-R) American Psychiatric Association diagnostic criteria for pathological gambling. Some aspects of the findings from this phase of the study are mentioned here. Others will be addressed in Section Three.

Phase One Participation and Expenditure Findings

From phase one it was found that 95 percent of the sample indicated that they had participated in at least one type of gambling at some stage of their lives; 90 percent in the last six months. This was the same percentage found for past 12 month's participation in the 1990 and 1995 Department of Internal Affairs surveys. As in those surveys, Lotto had the highest following, 87 percent having purchased a ticket at some time, 78 percent saying they purchased one during the past six months and 42 percent reporting that they did so once a week or more. Lifetime and past six month participation levels for the other major forms of gambling were: raffle tickets (lifetime, 82%; past 6 months, 57%), Instant Kiwi (68%; 51%), gaming machines (41%; 16%), track betting (45%; 15%), informal bets with friends and others (39%; 16%), cards (21%; 5%), housie (18%; 3%), gaming or casino evening (20%; 2%), dice games (11%; 1%) and football pools (13%; 4%). These findings frame and closely parallel those of the 1990 Department of Internal Affairs face-to-face survey that used a past 12 months interval rather than six months and life-time.

Lotto was also the form of gambling that respondents reported that they enjoyed participating in the most, followed by track betting, Instant Kiwi, gaming machines, lotteries/raffles, card games and betting on events. A quarter of the participants said they did not have a favourite form of gambling. This aspect was not covered in the other New Zealand national surveys.

The 1991 survey, in contrast to the other New Zealand surveys that had smaller samples, examined Pacific Islander participation separately. However, the sample totalled only 95. Consequently, these findings should be treated with caution.

Pacific Island respondents reported very high levels of participation relative to other ethnic groups in Lotto (54% were weekly players), Instant Kiwi (22% weekly participation) and track betting (19% weekly participation).

The 1991 study considered unemployed respondents separately. Unemployed people were over-represented among regular Instant Kiwi participants (18% played weekly), track bettors and gaming machine participants (both 7% weekly). Other sociodemographic differences were generally consistent with those of the 1990 Internal Affairs survey. Major findings will be considered shortly, in conjunction with gambling expenditure.

Both the 1990 Department of Internal Affairs and the 1991 surveys asked respondents how much they spent on each of a variety of gambling activities. In both studies it was left to respondents to decide whether to give an estimate of outlay (expenditure regardless of winnings), or whether to take winnings into account and provide a net estimate. In addition to the difference in modality (one survey was conducted by telephone and the other involved face-to-face interviews), there were several other

differences between the two studies. In the 1990 survey, respondents were asked to state how much they spent on an average day when they took part in each activity. Monthly expenditure was then determined by multiplying each estimate by reported frequency of participation. In the 1991 survey, respondents were simply asked to provide an estimate of how much they spent on each form of gambling in a typical month. This study also included expenditure data for a longer list of activities.

The mean reported expenditure for the 1991 sample was NZ$37 per person, per month. Expressed annually, this represents NZ$444 per person, virtually identical to the 1990 Internal Affairs survey figure of NZ$446. This gives an estimated total annual national expenditure of NZ$970 million in 1991. This compares with 'actual' national gambling turnover of NZ$2.32 billion and net expenditure of NZ$593 million for the financial year ending year ending 31 March 1990 (Department of Internal Affairs, 1990). These official figures do not include a number of the minor forms of gambling or illegal gambling activities. Consequently, they are conservative. When the additional gambling activities from the 1991 study are removed to make the lists from the two studies comparable, the overall monthly expenditure estimate reduces from NZ$444 to approximately NZ$400. This is more consistent with the findings of Australian surveys where it was found that respondent estimates were lower than calculated estimates. However, the difference was not as large as in Australia where the estimates were obtained in the same survey.

Christoffel (1992) compared the expenditure data from the 1990 Department of Internal Affairs and 1991 surveys for each of the major forms of gambling. He notes that the general pattern of results was similar although the Department survey expenditure estimates were somewhat higher for most activities. The Lotto figures were almost identical. The largest difference was for track betting, where the Department survey estimate was double that of the 1991 survey. In the latter survey, Lotto accounted for 35 percent of total estimated expenditure, followed by track betting (16%), cards (15%), Instant Kiwi (9%), lotteries/raffles (7%), gaming machines (5%) and betting on events (5%).

Although overall life-time and past six month gambling participation differences between men and women were relatively small, men, particularly young men, were more likely to engage in gambling activities on a regular basis. Men also reported spending twice as much as women per month. This difference was greater than that found in the Departmental survey. Men were much more likely than women to bet on track events, participate in gaming machines and play cards for money. Although more men than women regularly purchased Lotto tickets, approximately half of female gambling expenditure went on this form of gambling compared to just over a quarter of men's.

Older people were over-represented among regular Lotto players and track betters, although respondents aged 18-24 years spent proportionately more on track betting than any group other than those aged 65 years and over.

As with the 1990 Departmental survey, gaming machines were far more popular among the youngest age group. In contrast to the Departmental survey, the 1991 survey found higher overall monthly gambling expenditure for the youngest (18-24 years) group than for other age groups. However, the Departmental survey included 15-17 year-olds in its lowest category. It is probable that this subgroup spent less than older adolescents and young adults. In both surveys, those aged 65 years and over reported the lowest overall expenditure. Apart from the oldest and youngest groups, age appeared to have little relationship to overall gambling expenditure.

Although Mäori were not over-represented in the major forms of gambling, they reported spending more on average than the European/Pakeha group. This difference was not as large as that reported for the Internal Affairs survey. Of the ethnic groups considered in the 1991 survey, Pacific Islanders reported the highest expenditure. Unemployed respondents also reported high levels of expenditure relative to other occupational groups. As in the Department's survey, students reported the lowest expenditure. Roman Catholics, in both surveys, reported higher expenditure than members of other religious groups or those with no religion. In both surveys, the lowest household income groups reported spending least overall on gambling and the highest income group reported spending most.

Fifty-seven percent of respondents said they took part in the gambling activities they most enjoyed to win money. Other reasons given, in descending order, were for fun or entertainment, to support worthy causes, to socialise or because of social pressure and for the excitement or challenge. These reasons are broadly consistent with those of the Departmental surveys, even though the question was presented differently. In the other surveys a checklist was presented to the respondent and responses were recorded for each gambling activity. The 1991 question related to each respondent's preferred activities and was unprompted by response options. Reasons given for gambling differed by age and gender. Young people more often mentioned gambling to win money as well as for fun or entertainment, excitement or challenge. Men also more often gave the latter reasons and were less likely to say they gambled to support a worthy cause. In addition they more frequently mentioned social reasons including family or peer pressure.

Phase Two Findings

Phase two of the 1991 survey was confined to phase one SOGS-R defined life-time problem and probable pathological gamblers (samples of 52 and 65 respectively) and regular continuous and non-continuous gamblers (both consisting of 50 participants). Regular gamblers were defined as respondents who reported gambling weekly or more. Non-continuous gamblers participated this frequently in discontinuous gambling activities such as Lotto, lotteries/raffles, bets with friends and football pools but not continuous activities. Continuous gamblers did likewise with respect to one or more of the continuous forms of gambling including track betting, gaming machines, housie, Instant Kiwi, cards, dice and casino games. Many respondents in this group also took part in non-continuous gambling activities, especially Lotto. Attempts were made to recruit all probable pathological gamblers, irrespective of their geographical location. Participants in the other sub-samples were randomly selected and recruited from the three major metropolitan areas of Auckland, Wellington and Christchurch. Interviews, for the most part, were conducted in respondent residential dwellings and took approximately 90 minutes on average to complete.

The report on phase two of the 1991 survey was primarily concerned with problem gambling (Abbott & Volberg, 1992). However, some information on other aspects of gambling was included.

Respondents were asked if they could recall seeing or hearing advertisements for any sort or gambling. Almost 90 percent recalled Lotto advertising, followed in descending order of frequency by Instant Kiwi, horse racing/TAB, lotteries and raffles. Only three percent of these problem gambling/regular gambling respondents could not recall some form of gambling advertising. There were no differences between the continuous and non-continuous samples although interviewer assessed pathological gamblers had somewhat different patterns of recall to the non-pathological groups.

As in phase one, respondents were asked to indicate, unprompted, their preferred type of gambling. A majority (70%) of non-continuous gamblers nominated Lotto. This was also the most frequently reported preference for continuous gamblers (42%). Twenty percent of continuous gamblers nominated track racing and 14 percent Instant Kiwi. Housie and gaming machines were both favoured by six percent in this group. Corresponding figures for the non-continuous respondents were four percent, eight percent, zero percent and six percent.

Many (44%) regular continuous gamblers actually reported a non-continuous form as their preferred activity that in most cases they also engaged in weekly or more. Similarly, some (18%) regular non-continuous gamblers preferred a continuous form although, because of the way respondents were classified, they engaged in such activities less than once a week.

Respondents were also questioned about their frequency of participation. Eighty percent of the continuous gamblers said they participated frequently in Lotto. Corresponding figures for the other non-continuous forms for this group were lotteries/raffles (38%), bets with friends (10%) and football pools (19%). In the case of the non-continuous respondents, 98% reported participating frequently in Lotto. Percentages engaging in the other non-continuous activities were almost identical to the continuous group.

The continuous gamblers were much more likely than their non-continuous counterparts to indicate frequent participation in Instant Kiwi (74% versus 44%). They also reported higher frequent participation rates than non-continuous gamblers in all other forms of continuous gambling. However, these differences were not as great as for Instant Kiwi and significant minorities of non-continuous gamblers reported frequent participation in track betting (16%), gaming machines (14%), other scratch tickets (10%) and card games (10%). Regular continuous gamblers generally reported spending more time and money on most forms of gambling than non-continuous gamblers. However, the sample sizes were very small for some types of gambling and these results must be treated with considerable caution.

As for the phase one sample as a whole, the phase two continuous and non-continuous participants gave winning money as their main reason for gambling, followed by entertainment or fun, socialising, excitement or challenge, as a hobby and to support worthy causes. Continuous gamblers were more likely than non-continuous gamblers to say their gambling was a hobby (22% versus 12%) or that they gambled to socialise (34% versus 24%). They were less likely to say they gambled for excitement or challenge (20% versus 34%). Again, the reliability of these apparent differences is uncertain owning to the small sample size.

Continuous gamblers were somewhat more likely than non-continuous gamblers to recall first starting gambling before they attained 18 years of age (52% versus 40%). Track betting, lotteries and raffles and card games were the forms most often reported as the initial activity engaged in.

Respondents were asked to describe their gambling participation following various major life stage transitions - leaving school, marriage/de facto relationship, arrival of children and leaving work (retirement or unemployment). Participants were classified as either interviewer-rated pathological gamblers (n = 21) or not pathological (n =196). With respect to the latter group, leaving school appeared to be associated with increased participation (24% increased; 11% decreased or stopped). The other transitions appeared to be associated with a net decrease, especially the arrival of children. Only two percent reported increasing their involvement at this time while a third said they decreased or stopped gambling.

Participation levels in particular forms of gambling also varied across life stage transitions. For example track betting, bets with friends and purchasing lotteries or raffles was less frequent following retirement or unemployment. However, Lotto, Instant Kiwi and perhaps gaming machine participation appeared to be higher at this stage. Average time spent gambling per session also reduced following retirement or unemployment and respondents more often said they gambled alone at this stage.

As discussed in Section One, the methodology used here, namely retrospective accounts of life history, is a proxy for prospective longitudinal study of change over time. The information gathered is prone to memory distortions. In the present instance, the findings and their interpretation are further confounded because the respondents are of varying ages, and cohort or generational effects are likely to be significant. Nevertheless, this information raises some interesting questions that could be further investigated using more rigorous methodologies.

Phase two participants were also administered a series of questions relating to perceived benefits and adverse consequences of gambling participation. Items were grouped under the following headings: personal, interpersonal/family, vocation/employment, financial, legal, and gambling characteristics. As mentioned, these questions were developed by Mark Dickerson and were subsequently included in some of the Australian surveys undertaken by Professor Dickerson and his associates. The negative or cost aspects will be considered in Section Three.

Relatively large numbers of regular gamblers who were not classified as interviewer rated pathological gamblers indicated that the following applied to them:

- Gambling has been a hobby and interest to me (43% ever; 38% last 6 months)
- My gambling has given me pleasure and fun (57%; 46%)
- I have daydreamed about getting a big win (53%; 45%)

- My gambling has given me something to talk about with family or friends (21%; 17%)
- Gambling is something we all talk about at work (45%; 24%)
- Thinking about gambling has helped me get through a boring job (18%; 10%)
- Winning at gambling has helped me financially (21%; 12%)
- When I was gambling I felt excited (42%; 33%)
- When I was gambling I felt relaxed (30%; 32%).

Many of the gambling participation surveys conducted internationally have focused on problem gambling. The responses listed point to some of the positive features of gambling for regular participants which, presumably, are part of the reason why gambling is a widespread activity in New Zealand and many other societies. It would be of interest to consider such aspects in more detail, for example in relation to particular types of gambling, for different ethnic and social groups and how they link to other social and psychological variables including measures of wellbeing and life satisfaction.

The North Health Survey

In 1996, the Committee on Problem Gambling Management commissioned the Northern Regional Health Authority, North Health, to undertake a needs analysis of problem gambling. Part of this analysis involved a national telephone survey that included some questions concerning gambling participation. Among other things, this survey was intended "to replicate the findings of the Abbott and Volberg (1991) study in terms of describing gambling behaviour and prevalence of problem gambling in the community" (1996, p.1).

As with the 1991 survey, telephone interviews were conducted by National Research Bureau interviewers. The sample size was 1,500. Telephone numbers were selected randomly from telephone directories to provide nation-wide coverage. The questionnaire was based on the one used in phase one of the 1991 survey. Similar weighting of the data was employed to adjust for under-representation of some groups and the effect of selecting only one respondent per household.

The response rate, defined the same way as in the 1991 study, was 46 percent. This was low relative to the 1991 survey and also differed in that the rate varied considerably across the country and was as low as 33 percent in some urban areas. Mäori, Asian and Pacific Island respondents were greatly under-represented. In the 1991 survey 4,053 people were interviewed. Of these, 323 were Mäori and 95 Pacific Islanders. Post-weighting of the 1996 data set could not adequately compensate for the very low response rates in these groups. Accordingly, the report authors concluded that their sample was not representative and that the findings should be treated with great caution. This was also apparently the reason the survey findings were not published. Reasons given for the low prevalence rate relative to the 1991 survey included:

- omission of unlisted telephone numbers and presumed under-inclusion of transient and mobile people
- the use of two rather than up to eight call-backs and resultant reduction in the number of hard to contact individuals
- lack of provision of interpreters for Pacific Island, Asian and some other ethnic groups.

With respect to gambling participation, the 1996 survey found that 92 percent of the sample reported having gambled at some time in their lives, similar to the 1991 finding. However, other than for Lotto, major types of gambling generally had much lower reported lifetime rates of gambling than was the case in 1991. Apart from casinos, where 15 percent reported having participated at some time, current (past 6 months) participation rates were also lower than the 1995 Department of Internal Affairs finding for past 12 months participation. Comparison with the findings of these other two surveys would appear to support the view that some types of gambler, including perhaps problem gamblers, were under-represented in the sample. However, while the report authors do not comment on this, the findings for participants who reported gambling weekly or more were virtually identical to those of the 1995 Departmental survey. It is thus possible that regular gamblers are better represented although, as neither the response rate nor detailed ethnic representation of the Departmental surveys are known, their samples may also have deficiencies.

Reported overall mean monthly gambling expenditure was comparable to that of the 1991 survey, namely NZ$35 compared with NZ$37. Increases were found for housie (NZ$43 compared with NZ$29) and gaming machines (NZ$17; NZ$11). However, track betting (NZ$24; NZ$42) and cards (NZ$72; NZ$119) were down. New Zealand casinos and Keno were not available in 1991. In 1996, the monthly means were NZ$27 and NZ$10 respectively. As with other surveys in North America, Australia and New Zealand, regular (weekly or more) gamblers reported spending appreciably more per month than less frequent gamblers. The overall expenditure for regular gamblers was similar to that found in 1991. Considering the substantial growth in the forms of gambling available and increases in gambling turnover and net expenditure from 1991 to 1995, the report authors expressed the view that "the population sample in this survey is different from the population sample in the 1991 Abbott and Volberg study" (p.7).

Given their concerns about the 1996 response rate and sample, the research team made additional call-backs (up to 8 as in the 1991 study) to numbers where contact had not been established and to respondents who initially declined to be interviewed. This resulted in a substantially boosted sample - from 1,500 to 2,040. This rate was probably as high as many if not most of the surveys examined for this review, although in the present instance no mention was made of whether or not this improved Mäori and Pacific Island rates. While recalculated problem gambling estimates were provided for the expanded sample, unfortunately information on other aspects of gambling participation is not available.

The North Health report also included information from 'fono' (community discussion groups) with Pacific Island people. Participants came from a wide variety of Pacific cultures and nationalities. It was agreed that there does not appear to have been any gambling in the Pacific Island societies represented at the meeting prior to the arrival of Europeans. There is no word for gambling in the Tongan, Samoan and Nuiean languages and today only limited forms of gambling are permitted in most Pacific Island nations. In New Zealand, where gambling is perceived to be promoted by government and the churches, participation levels were considered to be very high.

Fono participants expressed the view that within New Zealand Pacific communities, a distinction is made between illegal gambling and activities like Lotto, track betting, casinos and gaming machines that are not regarded as real gambling. No participant was reported to have expressed surprise at the claim that Pacific Island problem gambling rates could be as much as six times the general population estimate. It was considered that horse racing and "fundraising" activities including housie, batons up and raffles were the most prevalent. A number of the Pacific Island churches were seen as strongly promoting gambling and some ministers were said to encourage parishioners to regard winnings as a "blessing from God to share with the church." It was noted that the Tongan and Samoan languages use the same word for "luck" and "blessing."

Similar meetings were held with Mäori. While variation was noted, gambling was generally seen as having a strong social or community focus, with groups often being whanau- (family) based. Within these groups, gambling, much like smoking and drinking alcohol, is regarded as a normal activity. Many participants spoke of gambling going "hand-in-hand" with drinking and smoking. A preference for horse racing among men was noted, with Mäori women favouring housie and gaming machines.

The 1997 AIGR Survey

As indicated above, in 1997 the Australian Institute for Gambling Research (1998) conducted a survey of Auckland and Christchurch households with listed telephone numbers, as a part of its report on the economic and social impacts of the Auckland and Christchurch casinos. The questionnaire was reported to have been modelled on that used in the 1995 Department of Internal Affairs survey to facilitate comparison. Response rates and methodological information are not provided in the report although the precise number of respondents interviewed (1,000) and close approximation of males and females suggests that it was a quota sample. Given the small sample (600 from Auckland; 400 from Christchurch) and lack of methodological information, it is uncertain how much confidence can be placed in the findings.

The past 12 months gambling participation rate (90% for Auckland; 95% for Christchurch) was marginally higher than that found in the Department's 1995 national survey. Forty-one percent reported participating in four or more activities during this period, virtually the same figure as in the 1990 and 1995 Departmental surveys. Most participated in one to three. As in 1995, Lotto (77% in Auckland; 78% in Christchurch), raffles (73%; 82%), and Instant Kiwi (40%; 54%) were the activities in which most people had participated during the past 12 months. Participation rates were higher for gaming machines outside casinos than was found in the 1995 national survey and lower for housie.

The 1997 survey found much higher overall gambling expenditure levels than those outlined in the 1990 and 1995 Departmental survey reports although all three surveys used the same method to estimate expenditure. As indicated above, little change was evident between the 1990 and 1995 surveys in this respect. In 1995, the mean annual estimated gambling expenditure was NZ$413 per respondent and the median NZ$145. The corresponding estimates from the 1997 survey were NZ$2,355 and NZ$299 for Auckland respondents and NZ$970 and NZ$301 for Christchurch respondents. The overall mean was NZ$1,794, more than three times the 1995 mean estimate. This apparent shift is perhaps better appreciated by considering the two extremes of the expenditure range, namely those reporting expenditure of NZ$100 per annum or less and those reporting in excess of NZ$700 per annum. In both 1990 and 1995, 45 percent of respondents were in the former category and ten to 14 percent were in the latter. In the 1997 survey, 32 percent were in the lowest spending category. The highest category increased markedly from 14 to 30 percent. In addition to substantially higher expenditure than was evident in 1995, the 1997 findings also differ in that there is a large difference between Auckland and Christchurch. In 1995, there was relatively little difference between the three regions considered.

Average estimated gambling expenditure for the 1997 sample as a whole for major forms of gambling were: TAB track betting NZ$511, Lotto NZ$319, cards NZ$239, casino table games NZ$235, machines outside casinos NZ$114, casino machines NZ$109, on course betting at races NZ$98, raffle tickets NZ$83, sports betting NZ$50, Instant Kiwi NZ$48 and housie NZ$37.

Mean overall gambling expenditure was found to be substantially higher for men than women in both Christchurch and Auckland, much greater than that reported for 1995. The 1997 age differences, while generally consistent with the relative pattern of differences in 1995, found greatly amplified differences relative to earlier surveys. However, the age samples were small and the estimates are therefore likely to be unstable.

As in 1995, Mäori were found to spend more than non-Mäori, as were Asian respondents in Auckland. Pacific Islanders, who were not considered separately in the Departmental surveys, reported by far the highest expenditures of all ethnic groups. The 25 Auckland Pacific Island respondents reported an average annual expenditure of NZ$13,468, more than seven times European/Pakeha expenditure. Again, it should be cautioned that samples of this size, can generate misleading findings. However, there are other indications of high levels of participation and expenditure among Pacific Island New Zealanders.

Seventy percent of the 1997 respondents reported having visited a casino in the past 12 months, compared with five percent in the 1995 survey which had been conducted shortly after the opening of the Christchurch casino. There was no gender difference in participation. Participants were more likely to be younger (aged 18-45 years), European/Pakeha, have relatively high incomes (NZ$41,000-NZ$80,000+ per annum) and be professionals or managers. Approximately 15 percent said they gambled at a casino more than once a month. Only about one to two percent indicated weekly participation. Those who visited a casino were twice as likely to say they participated in machine gambling than table games. Although Christchurch respondents indicated that they visited casinos more often than the Aucklanders sampled, they reported spending less per visit (NZ$53 relative to NZ$94 for table games; NZ$30 versus NZ$43 for machines).

It would have been helpful to have more information on how, precisely, this survey was conducted and know what the response rate was. The authors conclude that it suggests a substantial impact of

casino gambling on gambling patterns and expenditure in Auckland and Christchurch. However it is not possible, without additional information, to know how much confidence can be placed in these findings. Further, even if the methodology was sound and the response rate high, the small sample alone would place severe limitations on the reliability of many of the sub-sample comparisons. In addition, without a control group (in this instance, those parts of New Zealand without casinos adjusted for other potentially confounding variables) it cannot be concluded with any certainty that casinos, or casinos alone, accounted for these apparent increases.

Conclusion

New Zealand, relative to most jurisdictions considered, has very high levels of lifetime and more recent gambling participation. Expenditure, however, both actual and reported, is lower than in Australian states. If the more recent AIGR findings are valid, there could have been a substantial increase during the past few years, especially in Auckland.

As in Australia, there have to date been no representative survey studies of youth gambling, other than older teenagers included in the adult surveys. In contrast to North America and Australia to a lesser extent, there does not appear to be significant regional variation in gambling participation although this may have changed since the introduction of casinos.

As in other countries, men generally have more frequent participation, especially in continuous forms of gambling, and spend more than women. Mäori, Pacific Islanders and perhaps Asians, appear to have high levels of involvement and expenditure. There are indications that beneficiaries and low income, marginalised groups may have reduced their gambling expenditure, relative to the early 1990s. However, their expenditure remains high as a percentage of total income. In contrast to the findings from Tasmania, face-to-face and telephone interview methodologies appear to generate comparable data.

Akin to North America and Australia, there are indications in the survey reports of a polarisation in attitudes towards gambling, particularly some continuous varieties, and a widespread belief that gambling problems have increased.

At the time of writing, in New Zealand, legislation relating to casinos, gaming and lotteries is before Parliament. A moratorium has also been placed on new casino applications. Three of the four applications that were lodged with the Casino Control Authority, prior to the moratorium being imposed, have been licensed. Submissions to the casino licensing hearings and the select committee considering the proposed legislation reveal similar levels of attitude polarisation to those noted in North America and Australia.

2.9 Gambling Participation Surveys: Methodological Considerations

The majority of Section Two has presented an overview of gambling participation survey research from North America, Australia and New Zealand. The Australian and New Zealand studies have been covered in some detail because of their relevance to major components of the 1998-1999 New Zealand Gaming Survey. This presentation has included discussion of some methodological aspects of the studies considered. The reason for this is that, as indicated in Section One, the methodology chosen by an investigator has a substantial impact on the confidence that can be placed in the findings and their contribution to the advancement of knowledge.

As indicated earlier, surveys are a widely employed form of field research. They contrast with experimental studies in that the researcher does not intentionally modify a significant aspect of the participant's environment while controlling other factors likely to influence the behaviour under investigation. It was further noted that surveys are essentially probes, involving interviews or the administration of questionnaires to assess the state of a population at a particular point in time. In the review to this stage, a large number of studies of this type have been considered. The great

majority involved either telephone or face-to-face interviews guided by a structured interview protocol. One of the New Zealand studies incorporated both methods in a two-phase design. Most were characterised by a high degree of researcher-determined measurement, for example by asking questions with specified response options, rather than allowing more open-ended responding.

Almost all of the surveys reviewed gathered information on various aspects of gambling and the sociodemographic profile of the respondents interviewed. To varying degrees, this enabled relationships between variables of interest to be considered, including differences in gambling participation between groups. Some of the studies used various forms of statistical analysis to examine the strength and statistical significance of these relationships and differences. Most, however, did not. The majority of these studies are essentially descriptive studies, with little relationship to theory and prior research or formal testing of hypothesised relationships between variables.

In some cases, similar questionnaires were administered to comparable population samples at different points in time, with a view to examining changes in gambling participation. None, however, formally tested the significance of apparent differences or qualified assertions of apparent change by referring to the size of variance estimates or confidence intervals pertaining to the surveys under consideration.

Although some studies obtained retrospective accounts from respondents to yield information about changes in their gambling behaviour over time, no prospective longitudinal survey of gambling participation, expenditure or attitudes was located. This lack severely limits any causal inferences that can be drawn from associations reported between gambling participation and other variables.

Relatively few of the surveys referred to have been published in peer reviewed professional or scientific journals. Only two of the Australian and New Zealand surveys were in this category, namely Dickerson, Baron, Hong & Cottrell (1996) and Abbott and Volberg (1996a), Volberg and Abbott (1994). The Dickerson et al article reported very little participation data and focused on problem gambling. Without substantial rewriting and the inclusion of additional methodological information, analysis and reflective critique of their substantive findings, in our view the great majority of the Australian and New Zealand studies would not be accepted for publication in refereed journals. In some instances, their methodological shortcomings are such that even these additions would not be sufficient to produce a publishable account.

Sampling deficiencies and low response rates characterised most of the studies considered. As mentioned previously, many survey reports did not give the response rate. When they did, it was not generally clear whether the denominator used to calculate the rate included the total pool of respondents eligible to be included within the survey. Thus the actual rate, defined as the total number of respondents successfully interviewed divided by the total number eligible, may well have been substantially lower than the figure provided. While there is no threshold rate that can be taken as the acceptable minimum in all situations, the lower the rate the greater the possibility that the sample is not representative of the population sampled. However a low rate, per se, does not mean that accurate estimates of gambling participation cannot be obtained. If the reason/s for non-response is/are unrelated to the matter under investigation, the response rate is not of great consequence. In the present situation, however, there is reason to believe that non-response is related to gambling behaviour.

Shaffer, Hall and Vander Bilt (1997), in their critique of problem gambling prevalence studies, advocate a minimum response rate of 70 percent. Most government statistical organisations including Statistics New Zealand and Statistics Sweden would be uncomfortable with rates below this in official surveys. Few if any of the North American surveys and, as far as can be determined, none from Australia and New Zealand, attained this rate.

The high refusal rates in many of the surveys, including the Australian door-knock studies, is of particular concern. There are clear indications that heavy, continuous gamblers are more likely to terminate interviews or not proceed to sections concerning questions about gambling or problem gambling (Dickerson et al, 1996). It is possible that gamblers in this category may also be more likely to decline being interviewed at the outset. If they know that the study concerns gambling, non-gamblers or people who gamble infrequently may also consider that it is not relevant to them and decline participation. Given the uncertainty about the characteristics of those who choose not to participate, it is highly desirable to attain high response rates in gambling surveys. However, as this is becoming increasingly difficult to achieve, it would be helpful to obtain more information about respondents who are hard to contact and who decline to be interviewed.

Many North American jurisdictions and both Australia and New Zealand are ethnically diverse. There are indications of wide variations in gambling participation between some ethnic groups. This is also the case for some other sociodemographic variables including age, gender, religion and labour force participation. With respect to ethnicity, few of the studies reviewed used interviewers proficient in ethnic minority languages. In some cases there was under-representation of respondents in these groups although most studies did not indicate whether they attained ethnic representation or not.

In the case of telephone surveys, even before contact is attempted, certain groups are under-represented, including those that might be expected to include heavy gamblers. For example, in New Zealand, although overall levels of residential telephone ownership are very high, both Mäori and Pacific Islanders have lower levels of ownership than New Zealanders of European or Asian descent. Abbott and Volberg's 1991 New Zealand national survey over-sampled Mäori and Pacific Islanders to compensate for the under-representation of these groups. However, while increasing the sub-samples to approximate their expected number in the overall sample, this method could not reach those without access to a telephone. It is possible that this latter group differed from their counterparts with telephones. This over-sampling procedure also increased the complexity of the sampling, an additional consideration that will be discussed shortly.

Many of the telephone surveys apparently made relatively few call backs to contact potential respondents. However, most survey reports did not provide information on this aspect. In the case of quota samples, non-contacts are simply replaced, further biasing the sample with people who are easy to contact. It is possible that heavy gamblers, problem gamblers and people with busy or erratic life-styles may be away from home more than others. Given this possibility, it would be important to make a substantial number of call-backs, some time apart, and at different days of the week and times of the day.

Most telephone surveys also failed to use a method such as random digit dialling that would reach telephone-owning residences that have unlisted (silent) or recently connected numbers. It is possible that this group differs with respect to gambling behaviour. Random digit dialling or the use of current listings would eliminate or reduce this potential source of bias. However, this still omits from the survey people who do not live in a residence with a telephone. Apart from under-represented ethnic groups such as those mentioned above, unemployed and low income people would be expected to be under-represented in many countries. It is also possible that a number of heavy gamblers who have got into financial difficulties will have had their telephones disconnected.

Earlier it was suggested that respondent under-reporting was at least part of the reason why surveys generally yield lower gambling expenditure estimates than official expenditure data indicate. This requires further investigation. In the alcohol and drug field, for example, it has been found that under-reporting tends to be higher among both very light and very heavy users (Alberta Alcohol and Drug Abuse Commission, 1998). However, lower estimates may also come about through biased sampling that does not adequately represent the section of the population with the highest rates of participation and expenditure.

Very few of the studies considered provided confidence intervals for even the major participation and expenditure measures reported. Given the relatively small sample size of most surveys, the margins of error associated with population estimates would be quite large. In the case of many subgroups within these studies, error terms would be so large that little confidence could be placed on findings pertaining to them and comparisons over time, or with other groups, would be meaningless. As indicated previously, very little formal testing of statistical significance of apparent differences between groups was undertaken. This did not, however, prevent the investigators from assuming or implying that these differences were real.

The sample designs of virtually all of the population surveys of gambling behaviour were technically complex. In other words, the methods used generated samples that varied from what would be attained if truly random and independent sampling of the population had occurred. As mentioned in Section One, complex samples have important implications for both variance estimates and subsequent statistical analysis.

Most of the surveys reviewed used multi-stage, stratified cluster designs. This refers to the different levels of respondent selection. For example, the telephone surveys involved the selection of telephone numbers from directories and the selection of people within households. The face-to-face community surveys involved the selection of small areas or units to sample from, the selection of households within these units and the selection of respondents within households.

The majority of studies considered appear to have made appropriate weightings for the selection of only one respondent from households of variable size (thus adjusting for over-representation of people who live alone or in small households) and post-stratified for a few other variables such as age and gender. This means that the samples were weighted to approximate, with respect to these variables, what would be expected if they were randomly selected from the population. While these adjustments do not correct for the many other sources of potential bias such as those mentioned earlier in this section, they do enable more accurate estimates to be made for the population as a whole. Complex designs do not, per se, present problems for point estimates such as means, medians or percentages. However, the standard errors and confidence intervals associated with these measures are typically greatly underestimated when standard formulae are used to calculate them. Furthermore, inferential statistical analyses conducted on data sets from complex designs generate results that will contain many errors.

Given the above situation, which probably applies to the great majority of survey research within the health and social sciences, the prudent approach is to confine the presentation of findings to simple descriptive statistics. However, this results in the loss of a great deal of important information. Of particular value is information about the confidence that can be placed on the estimates reported and apparent differences between groups. Researchers are also frequently interested in examining more detailed relationships between variables. These relationships can be of considerable theoretical and/or practical significance. Often, researchers have used standard statistical procedures that are employed widely within their disciplines. While reports including such analyses are commonplace in many professional and scientific journals, they are likely to provide incorrect and misleading results. As Brogan (1997) demonstrates these errors can, in many instances, be serious.

Although these problems have been apparent to mathematical statisticians for many years (Kish, 1984), it is only recently that statistical packages have become available to deal with some of them. Two that are currently available include WesVar and SUDAAN. These software packages allow variance estimates to be derived from complex samples, and more robust statistical analyses, including some forms of multivariate analysis, to be undertaken. With respect to gambling surveys the major implication of the foregoing is that where confidence or range estimates are provided, they are likely to under state the actual ranges. Further, where statistical tests of significance are used to examine relationships between subgroups or other variables, many of them will be wrong. When there are errors, they will usually be instances where relationships are claimed to be significant when they are not.

All surveys have some other inherent problems additional to those considered above. They rely on asking people about aspects of their lives that they may or may not choose to report accurately. Gambling can be expected to be one of the areas of peoples' lives that some respondents will not want to discuss with interviewers. As previously noted, even when respondents are willing to be interviewed, there can be problems with recall, especially for distant events. The reliability and validity of information obtained is also influenced by a variety of additional factors that have been investigated by social scientists. Some of these sources of bias can be reduced by careful questionnaire design, pre-testing and piloting prior to commencing the study (Schwarz, 1999). The use of standardised measures that have been validated and used in other studies also increases the likelihood of obtaining valid information and facilitates comparison with previous research. However, caution is required when standard instruments are used in new situations, especially where there are cultural or linguistic differences between settings.

These various methodological issues, and some additional ones, are all relevant to surveys of problem and pathological gambling, that will be considered in the next section.

3. PROBLEM AND PATHOLOGICAL GAMBLING

3.1 Introduction

This section provides a critical review of problem and pathological gambling research, with a focus on conceptual and methodological issues, previous community prevalence studies and special populations, for example young people, ethnic minorities and prison inmates. As with the previous section, while the international literature is considered, major emphasis is placed on North American, Australian and New Zealand studies. The North American focus stems from the fact that the great majority of problem gambling research has been undertaken in that part of the world. Many of the conceptual and methodological advances have also been made in that continent and have influenced researchers in other countries. Australian academics and clinicians have also made significant contributions to problem gambling research internationally and have conducted a number of prevalence studies. These studies and previous New Zealand research are considered in some detail because of their relevance to the New Zealand Gaming Survey.

3.2 Definitions of Problem Gambling

Introduction

In Section Two it was evident that gambling participation has increased throughout this century in many parts of the world. Most people in many countries have participated in gambling activities at some time and a majority gamble regularly. A smaller number participate weekly or more often. Most people spend relatively modest sums on gambling. However a minority of regular gamblers, principally those who engage in continuous forms, spend a substantial portion of their total incomes. For example, in Australia, it has been estimated that a group comprising just over one percent of the adult population accounts for more than a quarter of total gambling expenditure (Dickerson, Baron, Hong & Cottrell, 1996).

Although the reasons why people gamble are numerous and vary across different types of gambling, it is evident that gambling is widespread, at least in part because people derive pleasure from it. Some patterns of gambling participation may contribute to personal wellbeing and mental health, although this has been little investigated. However, like most 'good' things in life, gambling is Janus-faced. For the large majority, their gambling experience appears to be generally positive and non-problematic. For a minority, gambling is associated with difficulties of varying severity and duration. Some people develop significant, debilitating problems that also result in harm to people close to them and to the wider community. These problematic gamblers are the focus of this section.

Historical Overview

Although the first reference to problem gambling did not occur in the professional mental health literature until early this century (France, 1902), there are numerous historical references to problem gambling and associated personal and social costs (Wildman, 1998). There are also accounts in works of fiction, for example Henry Fielding's 'Amelia,' Dostoevsky's 'The Gambler' and Dickens 'The Old Curiosity Shop' that graphically describe serious problem gamblers. Official and public recognition of the problems that can be associated with gambling probably played a role in the genesis of measures taken at various times in the past to prohibit or regulate gambling activities. In these earlier times gambling problems were generally regarded as a moral vice or character flaw rather than an illness or mental disorder. This was also the case with problematic alcohol consumption and a number of other troubled and/or troublesome patterns of human experience and behaviour that are today regarded as forms of mental disorder.

As with alcohol misuse and dependence, serious consideration of problem gambling by health

professionals was preceded by that of lay people. Gamblers Anonymous (GA), modeled on Alcoholics Anonymous (AA), was founded in the United States in 1957 (Gamblers Anonymous, 1985). GA provided a medical model conceptualisation for what it referred to as 'compulsive gambling' and a self-help programme similar to AA's 12 steps. Like the AA model of alcoholism, compulsive gambling was construed as a progressive illness that can never be cured but can be arrested by total abstention from gambling. GA spread throughout the United States and later to other parts of the world during the 1960s and 1970s. The first New Zealand chapter was formed in Christchurch in 1978.

Some attention was given to problem gambling by early psychoanalysts including Van Hattenberg (1914), Simmel (1920) and Freud (1928). The first in-patient treatment programme for problem gamblers appears to have been that of Custer and his colleagues in 1972 (Taber, McCormick & Ramirez, 1987).

Psychiatric Approaches

Although disordered gambling had received some prior attention from mental health researchers and clinicians, it was not until 1980 that it was formally defined as a mental disorder. In that year pathological gambling was included in the third edition of the American Psychiatric Association's 'Diagnostic and Statistical Manual' (DSM-III). It was classified as a disorder of impulse control, along with pyromania and kleptomania. In subsequent editions of this manual, namely the DSM-III-R (1987) and DSM-IV (1994), it has remained in this category. At each revision, the diagnostic criteria for pathological gambling have been modified somewhat. The 1980 version required four of seven criteria to be met. In the 1987 revision, the requirement was four of nine criteria. In the current version, the diagnostic criteria are as follows:

> Persistent, maladaptive gambling is expressed by five or more of the following. The patient:
>
> - Is preoccupied with gambling (relives past experiences, plans new ventures, or devises ways to obtain seed money)
> - Needs to put increasing amounts of money into play to get the wished for excitement
> - Has repeatedly tried (and failed) to control or stop gambling
> - Feels restless or irritable when trying to control gambling
> - Uses gambling to escape from problems or to cope with dysphoric mood (such as anxiety, depression, guilt, helplessness)
> - Often tries to recoup losses ("chasing losses")
> - Lies to cover up extent of gambling
> - Has stolen (embezzlement, forgery, fraud, theft) to finance gambling
> - Has jeopardised a job, important relationship, or opportunity for career or education by gambling
> - Has had to rely on others for money to relieve the consequences of gambling
>
> A Manic Episode does not better explain this behaviour.

Although a cut-off point of five is required for a diagnosis to be made, the study that gave rise to the DSM-IV revision actually found that a cut-off of four made the optimal separation between independently diagnosed pathological gamblers and a sample of drug abusing "social gamblers" (Lesieur & Rosenthal, 1991; 1998).

The DSM-IV criteria for pathological gambling require the clinician to determine that a patient who meets five or more of the diagnostic indicators did not do so because he or she was experiencing a manic episode. The DSM-III criteria included a similar exclusion requirement for Antisocial Personality Disorder but not mania. This latter requirement was dropped from the DSM-III-R.

The diagnostic term 'pathological gambling' has now largely replaced its GA predecessor

'compulsive gambling' in clinical settings and in professional and scientific discourse in most parts of the world including New Zealand (Ministry of Health, 1996). However, a degree of semantic confusion and controversy persists. A number of Australian academics and clinicians, for example, have a strong aversion to the designation of pathological gambling as a mental disorder and prefer the terms 'problem gambling' (Dickerson, McMillen & Hallebone et al, 1997) or 'excessive gambling' (Walker, 1992).

Pathological gamblers examined in treatment settings frequently suffer concurrently from additional mental disorders or psychiatric symptoms (co-morbidity), for example major depression, alcohol and/or drug dependence, and a variety of anxiety-related disorders including phobias and obsessive-compulsive disorder. Very high rates of concurrent personality disorder have recently been reported (Blaszczynski & Steel, 1998). This degree of overlap is not unique to pathological gambling. It is also found with many other mental disorders and the DSM-IV permits the diagnosis of more than one disorder in a given patient. However, research further suggests that a more fundamental condition may underlie a spectrum of disorders including pathological gambling. For example, Hollander and Wong (1995) have examined parallels between some sexual disorders, body dysmorphic disorder and pathological gambling and concluded that they might all be better regarded as expressions of obsessive-compulsive disorder. It is possible that further research will support this contention and that pathological gambling may in the future be classified differently, divided into primary and secondary forms, or replaced by another diagnostic term.

As indicated in Section One, scientific concepts are derived constructs that undergo constant revision and evolution. They are not right or wrong in any absolute sense. Rather, they are better judged by their utility, including their capacity to organise existing information, generate useful predictions including response to treatment, and direct research along new lines that will further enhance understanding. It should be noted that they also often contain an ideological component, relating to the aspirations of professional groups and prevailing cultural beliefs and understandings. Furthermore, science and professional practice themselves are part of the social systems within which they operate. The DSM and other psychiatric and psychological diagnostic frameworks have, this century, embraced an expanding array of dysfunctional varieties of human experience. They have played a significant role in the medicalisation of spheres of distressing 'mad' and/or 'bad' human behaviours that in earlier times were construed differently.

A number of academics from different disciplines and perspectives have challenged psychiatric diagnostic systems generally for varied reasons (Kutchins, & Kirk, 1997). In the 1960s and 1970s this included Radical Sociologists and Anti-Psychiatrists who argued that mental disorders were a myth or a means of exercising social control over or oppressing people who display 'deviant' behaviours. A number of more main stream mental health researchers and clinicians have also questioned the validity and reliability of psychiatric diagnoses. Recently Dickerson, McMillen & Hallebone et al (1997), following Wakefield's (1997) critique of DSM-IV conceptualisations of mental disorder generally, suggested that the DSM-IV criteria for pathological gambling may fail in the Australian context to "distinguish true pathological gambling from non-disordered gambling" (p.15). They continue:

> In the Australian context, where per capita expenditure on legal gambling is higher than in other jurisdictions internationally, and where there is generally positive social acceptance of gambling as an important leisure activity, the criteria of the DSM-IV are likely to be over-inclusive. For example it would be natural and commonplace for a person who regularly enjoys horse racing or blackjack to feel excited and to find that the activity alleviates frustration or stress….(p.16).

Although Dickerson and other Australian psychologists and psychiatrists, including Walker (1992) and Allcock (1998), have argued against disordered or problematic gambling being classified as a mental disorder, in the 1997 report just quoted it is implied that it does exist in this sense. In the present context, as in Australia, the concern is with over-inclusion - the inappropriate diagnosis of people who do not in fact suffer from serious gambling problems. While this provides a cautionary

note when diagnostic entities are invoked in different cultural contexts, convincing empirical evidence supporting this conjecture is not advanced. Equally, it might be argued that gambling problems have become so widespread in Australia that some clinicians and perhaps the population more generally no longer regards less severe forms as problematic. One is reminded of the quip concerning the definition of an alcoholic - someone who drinks more than his doctor!

Behaviourally oriented academic and clinical psychologists, as well as practitioners within some other schools of psychotherapy, have continued to challenge the value of psychiatric diagnostic approaches to the understanding of mental health problems (Schachter & Nathan, 1977; Wakefield, 1997). While these challenges have undoubtedly been driven by philosophical, scientific and pragmatic clinical considerations, they also appear to reflect an ideological schism arising from 'turf warfare' between groups of mental health professionals and others such as pharmaceutical companies in the highly competitive North American mental disorder market place.

In Section One, quantitative and qualitative measurement and research methodologies were considered. While the DSM-IV diagnosis of pathological gambling is quantitative in that it involves meeting five of ten specified criteria, it results in the separation of people into two categories - pathological gamblers and people who are not pathological gamblers. Relatively clearly defined diagnostic categories such as pathological gambling are important in that they enable researchers and clinicians to communicate clearly with one another and make meaningful comparisons across studies. However, this strength has a downside. Clarity and simplicity involve a trade-off with a loss of information. There is a great deal of variation within the category and a great deal excluded from it that is likely to be relevant to furthering our understanding of gambling-related problems. Similarly, from the perspective of overall social costs, it is probable that people who fail to cross the diagnostic threshold yet experience some gambling-related problems will greatly outnumber diagnosed pathological gamblers and may collectively give rise to more problems within society than the latter group.

Addiction and Excessive Behaviour Conceptualisations

In the popular media and in clinical circles, problem gambling is sometimes referred to as "gambling addiction." Although initially confined to mood altering substances, in recent years a wide variety of so-called behavioural addictions have been proposed, including "addictions" to food, exercise and sex, among others. As indicated above, GA closely modelled compulsive gambling on alcoholism. Furthermore, although included as a disorder of impulse control in the DSM, the diagnostic criteria for pathological gambling, with the exception of "chasing losses", were essentially derived from characteristics that define alcohol, cocaine, heroin and other forms of drug dependence (Lesieur & Rosenthal, 1991).

Many parallels have been noted between pathological gambling and various forms of drug dependence. Walker (1992) summarises and critically examines a number of the many relevant studies. Even before pathological gambling entered the DSM-III, behaviourally oriented clinicians, primarily psychologists, included gambling with alcohol misuse, smoking and other forms of substance abuse and eating disorders - so-called excessive behaviours (Dickerson, 1984; Orford, 1984). However, while there are many parallels, a number of differences between pathological gambling and drug dependence have been noted (Lesieur & Rosenthal, 1991; 1998).

Earlier, reference was made to the relatively high degree of co-morbidity between pathological gambling and drug dependence. In other words, a significant minority of pathological gamblers also meet diagnostic criteria for one or more forms of substance dependence and vice versa. This has led to consideration of the possibility of an underlying condition that predisposes people to one or more forms of substance or behavioural addiction. This is sometimes referred to as the general theory of addiction (Jacobs, 1993; Walker, 1992). Currently, this is still very much in the realm of hypothesis. The verdict remains out on whether or not there is an underlying general addictive disorder or predisposition to addictive patterns of behaviour. If there is, whether or not it applies to problem gambling is also a moot point at this time.

Other Approaches

Mention was made above to early psychoanalytic writings on pathological gambling. There has remained some interest in this topic within the various psychoanalytic traditions although there has been little or no research to test many of the conjectures that have emerged. Walker (1992) and Wildman (1998) provide partial reviews of the relevant literature. Wildman (1998) concludes that currently, the leading analytic position is that excessive gambling is essentially grounded in feelings of guilt and is a form of self-punishment. He adds, "it is to be regretted that the ingenuity and literary quality of psychoanalytic writings on gambling are not matched by experimental verification" (p.159).

Dickerson has long advocated a shift from categorising problematic gambling as a psychiatric diagnostic entity to a more fine-grained description of the gambling behaviour of heavy gamblers and associated problems in other life domains. His call for this change of focus appears to arise from: (a) general opposition to psychiatric diagnosis and psychiatric approaches to psychopathology, (b) the difficulty involved in identifying problem and pathological gamblers in the community using diagnostic measures and (c) a belief in the superiority of an alternative approach that directs attention to the whole population of gamblers and, through the identification of risk factors, leads more naturally into prevention and 'harm minimisation' strategies.

Although Dickerson and a number of his Australian colleagues have generally used the terms 'problem gambling' and 'cases of problem gambling' to refer to people who experience severe gambling-related problems, recently he has argued that the problem gambling concept requires qualification. Specifically, "problem gambling per se is a misnomer - the issue for the individual person who participates in gambling activities, and for family, the community and jurisdiction, is whether the associated gambling impacts are harmful, in what ways and to what extent" (Dickerson et al, 1997, p.106). An alternative to pathological gambling is advanced, namely:

> 'Problem gambling' refers to the situation when a person's gambling activity gives rise to harm to the individual player, and/or to his or her family, and may extend into the community (p.106).

Dickerson et al (1997) expanded on this definition by outlining the main categories of harm that frequently arise from gambling activities, namely: intrapersonal, interpersonal, financial, vocational and legal. They further note that whether an impact is deemed harmful or not will be strongly influenced by the context in which it takes place and that it is essentially a value judgement made by one or more of the affected parties. As such, it will also depend on social norms and its assessment will be more difficult in societies with diverse cultural composition and value systems.

While this approach is much more inclusive than the DSM pathological gambling categorisation and may well provide a useful framework to guide research and organise research findings, it could be expected to present an enormous challenge in terms of operationalisation. In addition, because what is judged to be harmful is heavily context specific and thus mercurial, it could make comparison from one study to another difficult or impossible. Walker (1998) has expressed similar concerns about this new definition of problem gambling and calls for an approach that uses more objective criteria.

Conclusion

In Section One we indicated that multiple theoretical approaches and a degree of conceptual confusion were typical of emerging fields of study as well as many more established social and behavioural science domains. This is not necessarily an undesirable situation as it can stimulate investigation from a variety of different angles and helps forestall premature closure. With respect to the field of problematic gambling, Shaffer, Hall and Vander Bilt (1997) observe that while there is general agreement that there are serious problems associated with gambling and a pressing need to understand them better, there is indeed a confusing array of terms in current usage.

Those mentioned to this point in our review have included problem and problematic gambling, excessive gambling, compulsive gambling, addictive gambling, pathological gambling and probable pathological gambling.

The issue of multiple definitions was brought to sharp focus for Shaffer, Hall and Vander Bilt (1997) because they were charged with the task of conducting a meta-analysis of prevalence studies undertaken in North America. This necessitated the adoption of a standard form of categorisation that covered the diversity of extant definitions and their operalisation by way of diagnostic measures. To this end, they coined yet another term, 'disordered gambling'. Their stated reasons for doing so were two-fold. First, they sought a term that transcended the various existing constructs by acknowledging that all of them represent, with varying degrees of intensity, disorder in one or more major areas of human experience. Second, their new term implies or represents a continuum of experience. In these respects, it shares Dickerson, McMillen & Hallebone et al's (1997) recognition of the diversity of experiences and problems that can occur in association with high levels of involvement in certain forms of gambling.

Shaffer, Hall & Vander Bilt (1997) subdivided disordered gambling into three levels. Level One represents people who do or do not gamble and don't experience gambling problems. Level Two represents gamblers with "sub-clinical" levels of disordered gambling. Others have referred to this group variously as 'problem', 'at-risk', 'in-transition' and 'potential pathological gamblers'. Level Three represents people with the most severe gambling-related problems. This appears to equate with 'compulsive gambling', 'probable pathological gambling' and 'pathological gambling'. The authors note that their Level Two category is bi-directional in that it can include both people who are moving toward the development of more serious problems or away from having experienced more serious problems. They assert that most previous systems that include this sub-clinical category assume people within it are progressing towards a more pathological state. This assumption would be consistent with the notion that pathological gambling is a chronic, progressive disorder.

In addition to the three levels just outlined, Shaffer, Hall and Vander Bilt (1997) include a fourth level that includes people who are "ready" to receive treatment.

We are of the view that the conceptual model just outlined has merit although we believe it warrants further refinement. We consider that Level One, for some purposes, is better divided into non-gamblers and gamblers who do not currently experience any problems. In some situations it may also be possible to separate out people who do not currently gamble or have gambling problems but who did in the past. This group may be at increased risk for future problem development. We also prefer the commonly used term 'problem gambler' for Level Two gamblers and agree that this contains both people who are developing more serious problems and those who are experiencing a reduction in problems. If both current and lifetime measures are employed in the same study or if respondents are being followed longitudinally, we are of the view that these two groups could be separated. Additionally, we accept that there could be a third group that is not moving appreciably in either direction but maintains a lower level of problematic gambling.

With respect to Level Three, we again favour sub-classification. We believe that the term pathological gambling should be used for people who have been so diagnosed by an appropriately trained clinician using current psychiatric diagnostic criteria. We further consider that people who score above the cut-off for pathological gambling on a psychometric instrument that has been validated against clinical diagnoses should be referred to as probable pathological gamblers. Finally, we see value in recognising people who indicate that they personally believe that they currently have a gambling problem. Such individuals could be at Levels One, Two or Three. This further differentiation is potentially important for treatment planning and public health education programmes. Our conceptualisation of disordered gambling is outlined in Figure One below.

Figure One: Classification of Problem Gambling

Shaffer, Hall & Vander Bilt (1997) Levels	Abbott & Volberg (1999) Framework	SOGS/SOGS-R DSM-IV score
Level One	**Non-gambler or Non problem gambler**[a]	
Represents the proportion of the population that does not experience problems	NG Never gambled	
	NP1 Non–problem gambler currently and in past	0-2 current 0-2 lifetime
	NP2 Non-problem gambler currently but a problem gambler in the past	0-2 current 3-4 lifetime
	NP3 Non-problem gambler currently but a probable pathological gambler in the past	0-2 current 5+ lifetime
Level Two	**Problem gambler**	
Represents gamblers with sub-clinical levels of gambling problems	PG1 Problem gambler currently but not in the past [b]	3-4 current 0-2 lifetime
	PG2 Problem gambler currently and a problem gambler in the past[b]	3-4 current 3-4 lifetime
	PG3 Problem gambler currently and a probable pathological gambler in the past	3-4 current 5+ lifetime
Level Three	**Probable Pathological Gambler**	
Represents the most severe form of disordered gambling	PPG1 Probable pathological gambler currently but not in the past[b]	5+ current 0-4 lifetime
	PPG2 Probable pathological gambler currently and in the past[b]	5+ current 5+ lifetime
	PathG Pathological gambler diagnosed as a pathological gambler by a clinician using current diagnostic criteria	5+ current and/or lifetime

Note

[a:] All categories can also be subdivided into those where the respondent states that he or she has a gambling problem and those who do not.

[b:] Separation of these categories requires longitudinal study with repeated assessments or the development of a questionnaire or interview schedule that allows past or 'lifetime' assessment independently of current state.

In addition, in some situations, we consider that it would be highly desirable to augment this classification with quantitative and qualitative measures that assess various dimensions of gambling and problem gambling with greater precision. In other words, we favour both diagnostic and multiple continua models. Which is given emphasis in a particular situation will depend on the particular purposes of the assessment.

3.3 The Measurement of Problem Gambling

Introduction

A wide variety of methods have been developed to measure problem and pathological gambling. These methods are strongly influenced by the conceptualisations of problem gambling that their developers adhered to at the time. A detailed overview of such screens is provided in Appendix One.

Screening and Diagnostic Instruments

The first problem gambling "screen" was the '20 Questions' developed by Gamblers Anonymous (GA) to provide self-assessment of compulsive gambling as it was defined by that organisation. Although widely used by GA as well as in some clinical situations, it was not until last year that a formal assessment of this instrument was published. Ursua and Uribelararrea (1998) administered the GA 20 Questions to problem gamblers involved with self-help groups in Spain and social gamblers matched for age and gender. In this setting, they reported that the questionnaire had high reliability, correlated strongly with the South Oaks Gambling Screen (SOGS) ($r = 0.94$), contained one factor that explained over half of the total variance and had high diagnostic efficiency. They also reported that a recent unpublished study obtained similar results with adolescents and that the GA 20 Questions out-performed two commonly used adolescent screens, the SOGS-RA and DSM-IV-J (Derevensky & Gupta, 1997). From these accounts it would appear that this instrument, while not developed by researchers or treatment professionals, performs as well if not better than any other screening device. However, as would be expected given its origin within GA, the questionnaire does not make a distinction between people who are currently experiencing significant gambling-related problems and those who did so at some time in the past. Furthermore, it has yet to be formally assessed with other problem gambler samples.

The first professionally developed scale to assess pathological gambling was constructed for use in Kallick et al's 1979 United States national survey of gambling that was described in the second section of this review. This measure was developed prior to the advent of diagnostic criteria for pathological gambling. Its diagnostic accuracy is uncertain and its other psychometric properties are unknown.

Since the advent of the DSM-III diagnostic criteria for pathological gambling a number of instruments have been developed for use with adults and adolescents. The first measure of this type was developed in the early 1980s as a part of the Diagnostic Interview Schedule (DIS) that was used in the Epidemiological Catchment Area studies in the United States. The DIS was subsequently used in surveys in a number of other countries to assess the general population prevalence of a broad spectrum of psychiatric disorders.

To meet DIS criteria for pathological gambling, people must have gambled at least twice in their lives; thought that they gambled too much; and said that they had experienced at least two of the following because of gambling or betting: (1) inability to pay bills; (2) trouble at home or work; (3) borrowed or stealing money. The pathological gambling component appears to have been used in only a few studies, including one in Christchurch, New Zealand, in 1986 (Wells et al, 1989; 1992) and the St Louis Epidemiological Catchment Area Study (Cunningham-Williams et al, 1998). The early version has not been adequately validated or assessed as a psychometric instrument. However, the DIS has changed each time the DSM criteria have changed. The DSM-IV version of the pathological gambling component of the DIS assesses each of the ten criteria and obtains age of onset for each criterion.

The most widely used measure based on DSM diagnostic criteria is the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987) and subsequent modifications to it, particularly the SOGS-R (Abbott & Volberg, 1991; 1992; 1996a). Although initially designed for use in clinical settings,

the SOGS or SOGS-R have been used in the majority of community prevalence surveys. The SOGS was based on the DSM-III criteria and validated against the DSM-III-R. From a technical point of view, the development of this measure was thorough. It was shown to have high reliability and correlated 0.94 with DSM-III-R diagnoses. Similarly, its overall diagnostic efficiency was impressive in the original validation groups, namely GA members, university students and hospital workers (Lesieur & Blume, 1987).

The SOGS-R, developed for the 1991 New Zealand National Survey of Problem and Pathological Gambling, modified the original screen to provide a measure of both current and lifetime problem and probable pathological gambling. It also provided the first attempt to validate the SOGS and the derivative measure in a community as opposed to a clinical setting. The two-phase design referred to in Section Two made it possible to compare the SOGS-R categorisations with independent (double blind) interviewer assessments using DSM-III-R criteria.

Taking the interviewer assessments as the 'gold standard' it was found that the lifetime measure was very good at detecting pathological gamblers among those who currently experience the disorder. However, it did so at the cost of generating a high number of false positives (i.e. people who score as pathological but who the interviewers did not identify as such). The current measure, on the other hand, produced fewer false positives and had greater efficiency. However, this was achieved at the cost of high numbers of false negatives (i.e. people who score as non-pathological but were rated pathological by the interviewers). The authors thus concluded that the lifetime measure was the preferred index for clinical screening purposes but that the current measure was more suitable for detecting rates of change in prevalence over time (Abbott & Volberg, 1992; 1996a).

This aspect of Abbott and Volberg's (1992; 1996a) findings should be treated with some caution as the interviewers, while guided by DSM criteria, were not clinicians experienced in making diagnoses of pathological gambling. This defect will, however, be remedied in a national survey that is presently underway in Sweden. In this study, clinicians with many years of experience in the diagnosis and treatment of pathological gambling will conduct the phase two interviews (Rönnberg, Abbott & Volberg, 1998). However, as Shaffer, Hall and Vander Bilt (1987) and others (e.g. Meehl, 1978) have asserted, in most areas of psychiatry there is in fact no 'gold standard' in the sense of having a definitive yardstick for diagnoses including pathological gambling. Even with improvements in the reliability of diagnoses since the advent of clearly specified criteria and decision rules, psychiatric diagnosis remains an inexact 'science'. Indeed, there is little evidence to indicate that diagnoses based on clinical instruments are more valid than diagnoses based on psychometric instruments, and some to the contrary (Meehl, 1954). Given this reality, we are of the opinion that rather than seek an elusive or illusory gold standard, investigators are better advised to triangulate by using two or more instruments in their surveys, either in combination or in two-phase designs.

A number of other instruments based on DSM and related criteria are described in Appendix One. Brief mention is confined here to some that have been developed recently and may well be widely used in the future. One, the Fisher DSM-IV Screen, is based closely on the ten DSM-IV criteria and uses four response categories for each question. In a survey of United Kingdom casino patrons, it was found to have high reliability as well as satisfactory factorial, construct and face validity (Fisher, 1996). It has also been used in United States surveys in conjunction with the SOGS-R. It evidenced moderate to high correlation with the SOGS-R in these studies. A version of this screen has been incorporated within the Swedish and New Zealand national surveys that are currently in the field. A second instrument, the Diagnostic Interview for Gambling Severity (DIGS) has more items than the Fisher DSM-IV Screen, two for each of the ten DSM-IV criteria. Like the former measure, it has high reliability as well as good convergent and discriminant validity (Winters, Specker & Stinchfield, 1997). An 11-item measure, similar to the Fisher Screen and referred to as the DSM Short Screen, has also been used within clinical settings in New Zealand since 1993 (Sullivan, Abbott & McAvoy, 1994). Very brief screening measures, based on a few

questions, are being developed for use by general medical practitioners and other primary health care workers (Johnson, Hamer & Nora, 1998; Sullivan, Arroll, Coster & Abbott, 1998; Pasternak, 1998).

Very recently, a further screen based on the DSM-IV has been developed. This new measure, the NODS (NORC DSM Screen for Gambling Problems), was designed for the 1998 United States National Gambling Survey that was described in Section Two. This scale consists of 17 lifetime items and 17 past year items which like the SOGS-R are intended to assess both past year and lifetime problematic gambling. This measure has high reliability. Although a pilot study was conducted with a small sample of problem gambling outpatients, its psychometric properties and validity have yet to be examined. The results of the pilot raise questions about the sensitivity of the current measure. As with the other DSM-IV based scales, five or more of the ten DSM criteria are required to be met for classification in the most seriously disordered category, referred to as Type E. Type E corresponds to Shaffer et als' (1997) Level 3 or to SOGS-defined probable pathological gamblers. Type D respondents are required to meet three or four criteria and thus approximate Shaffer et als' Level 2 or SOGS-defined problem gamblers. Type C respondents meet one or two criteria. Types B and A report no adverse effects. In the National Survey, the NODS was only administered to respondents who acknowledged losing US$100 or more in a single day or who acknowledged that they had ever been US$100 or more behind during a whole year of gambling. Other than Type A, respondents in all of the other categories also reported that they met this additional criterion.

As indicated above, Dickerson has advocated a shift from a preoccupation with case identification to an approach that quantifies relationships between participation in particular forms of gambling and the risk of developing problems in various life domains. Efforts to operationalise this approach have included the development of a series of questions examining positive and negative impacts of gambling in these domains. As mentioned in Section Two, these questions were first used in phase two of Abbott and Volbergs' 1991 New Zealand national survey. These questions have since been used in Australia but have not, to date, been refined and validated as a psychometric instrument.

Australian researchers have also been developing a Scale of Gambling Choices (SGS) for some years now, to assess impaired control of gambling. Although it has been used in some Australian prevalence surveys, its authors believe that the scale requires further development before it is considered for more widespread adoption. Walker and Dickerson (1996) have acknowledged that these alternative measurement approaches "have been based purely on face validity" (p.244) and have yet to be fully developed and refined in accordance with accepted psychometric standards. Other investigators are also seeking to develop alternative measures of more specific aspects of gambling-related problems from a variety of theoretical perspectives. For example, Ladouceur is developing a questionnaire to assess erroneous cognitions that frequently accompany gambling and problem gambling behaviour.

Conclusion

There has recently been a rapid expansion in the number of measures available to assess problem and pathological gambling. The SOGS and SOGS-R remain the most widely used instruments in clinical and community settings internationally. It is likely that they will continue to be used, in part because they have been so widely used in the past and because this allows comparisons to made over time and across jurisdictions. However, there appears to be growing dissatisfaction with the SOGS, partly stemming from its derivation from a version of the DSM that is now out-dated. It is likely that one or more of the new DSM-IV based screens will gain widespread currency. Further research regarding the psychometric properties and validity of these new screens in a variety of settings is required. Research to date, however, indicates that performance on some of these new measures correlates very highly with the SOGS and SOGS derivatives. Performance on these latter instruments also correlates very highly with the long-standing GA 20 Questions

screen. This strongly suggests that they are essentially measuring the same underlying construct. While the SOGS may be going out of fashion in research circles, to date no other measure has been demonstrated to be superior to it. Perhaps it should be cautioned that, as in other spheres of life, fashion is no guarantee of quality.

3.4 Prevalence Studies

This section considers epidemiological approaches to the study of mental disorders in relation to problem and pathological gambling. It then critically examines prevalence studies undertaken to date in various parts of the world.

Epidemiology

Epidemiology, the study of the distribution of physical and mental disorders within populations, is primarily concerned with specifying the incidence and prevalence of particular disorders and identifying risk factors. Whereas incidence refers to the rate at which new cases arise during a given period of time, prevalence refers to the percentage of people suffering from a disorder within a population or sub-population. Prevalence is also specified within time periods, ranging from current (typically one, six or twelve months) to lifetime. Epidemiological research has played an important role in identifying factors that determine or influence the development of disease and other health-related events. Epidemiological research is also important in the design of effective prevention programmes and in the planning of treatment services.

Abbott (1994a), in a chapter that provides an overview of psychiatric epidemiological research in New Zealand, commented:

> Like most physical diseases, mental disorders are not randomly distributed throughout the population. To varying degrees they follow existing lines of structural inequality and disadvantage within society. Again, as with physical disease, patterns of mental disorder are far from static. New disorders emerge, are identified or constructed. Others increase or decrease in incidence and/or prevalence (p.119).

As indicated above pathological gambling was, from a formal psychiatric nomenclature perspective, 'constructed' in 1980, albeit a construction heavily reliant on prior GA conceptualisations. It entered the DSM-III along with traumatic stress disorder and a variety of other new mental disorders. At the same time, as a consequence of changing social attitudes, research and political lobbying, homosexuality was declassified. Abbott (1994a) has further maintained that pathological gambling is one of a number of 'sunrise' disorders in New Zealand, likely to have increased in prevalence in recent years. Other disorders placed in this category included major depression among young men, youth suicide, eating disorders, and some forms of chronic organic brain syndrome.

In summarising the New Zealand literature, it was concluded that mental disorders collectively have a high prevalence throughout the teenage and adult years (a 12 month prevalence of approximately a quarter of the population and lifetime prevalence of approximately two-thirds). Most disorders are chronic, many either partially responding to treatment or following a fluctuating course of periods of remission and relapse. It was also found that the majority of people who suffer from mental disorders do not seek or receive treatment. Abbott also cited the public health dictum that even in the unlikely event that there would ever be sufficient resources to treat all people presently suffering from mental disorders, this would not reduce their incidence. Furthermore, it is only through the reduction of incidence that prevalence can be appreciably reduced long-term. Incidence reduction requires effective primary prevention programming (Abbott & Braun, 1989).

Psychiatric epidemiology "came of age" from the mid 1980s with the adoption of standardised interview instruments including the DIS that yielded reliable diagnoses for specific mental disorders. However,

many of the standard concepts and procedures used in this discipline have yet to be widely adopted in prevalence studies of problem and pathological gambling. Even basic terms such as incidence and prevalence are not clearly used in this field. For example, the Dickerson, McMillen & Hallebone et al (1997) report referred to above is titled 'Definition and Incidence of Problem Gambling, Including Socio-economic Distribution of Gamblers'. Yet, this report primarily focuses on prevalence studies and, other than in the title, contains no reference to the incidence of problem gambling.

When screening instruments, including diagnostic interviews such as the DIS are used to detect physical illnesses or mental disorders, classification errors are expected. False negatives (failing to detect problems when they are present) are of particular concern in clinical situations where they may have grave consequences for patients (and clinicians). False positives (classifying someone as having problems when they do not) are generally of less concern if the initial screening is followed by more detailed assessment.

In clinical settings where a high percentage of people being assessed actually experience the problem in question, almost all screens generate relatively few false positives or false negatives. Indeed, if the percentage of people presenting with the disorder of interest is very high (i.e. there is a high base rate of the disorder), random guessing on the part of the clinician would also produce a high 'hit rate.' In community surveys where base rates are low, most clinically derived measures generate large numbers of false positives. This has the potential to significantly inflate the estimated prevalence rate in such surveys. However, typically false negative rates also increase and counteract this effect - i.e. they decrease the prevalence estimate. Quite small increases in false negatives can have a substantial impact in this regard. Consequently, in determining the accuracy of prevalence estimates, it is important to know the relative frequency of false negatives and false positives. Unfortunately, very little research has been undertaken to assess the performance of problem gambling instruments in this respect within general population settings.

Surveys of Problem Gambling

Introduction

In the 1980s, following the first inclusion of pathological gambling in the *Diagnostic and Statistical Manual* (DSM-III) (American Psychiatric Association, 1980) and the rapid expansion of legal gambling in the United States, researchers from a variety of scientific disciplines began to investigate the phenomenon of gambling-related problems. The earliest work in this field sought to identify the particular complex of behaviours that characterised 'pathological gambling.' This research focused on individuals who had sought help from GA or one of the few professional treatment programs for gambling-related difficulties (Custer, 1984; McCormick, Russo, Ramirez & Taber, 1984; McCormick, Taber, Krudelbach & Russo, 1987; Ramirez, McCormick, Russo & Taber, 1983; Taber, McCormick & Ramirez, 1987).

As state and provincial governments began to establish services for individuals with gambling problems, questions arose about the number of pathological gamblers in the general population who might seek help for their gambling difficulties. These questions required epidemiological research to identify the number (or 'cases') of pathological gamblers, ascertain the demographic characteristics of these individuals, and determine the likelihood that they would utilise treatment services if these became available. In the 1990s, epidemiological surveys of gambling and problem gambling became an essential component in the monitoring of legal gambling in many countries, including Australia, New Zealand, Canada, and the United States (Volberg & Dickerson, 1996).

In the late 1990s, policy issues surrounding legal gambling and the corresponding research needs have become far more complex. Policy makers, government agencies, gaming regulators and gaming operators are concerned about the likely impacts of changing mixes of legal gambling on the gambling behaviour of broad segments of the population as well as on the prevalence of gambling-related difficulties. Public health researchers and social scientists are concerned with minimising the risks of

legal gambling generally or to particular subgroups in the population. Economists, financial institutions and law enforcement professionals are concerned about the relationship between legal gambling and bankruptcies, gambling and crime, and the reliance of the gaming industries on problem gamblers for revenue. Treatment professionals, government agencies and voluntary sector organisations are concerned about how to allocate scarce resources for the prevention and treatment of gambling problems (Volberg, 1998b).

As indicated in Section Two, legal gambling has to varying degrees become an accepted part of the social and cultural landscape of many countries around the world. It has been argued that a critical element in the growing legitimacy of gambling has been the medicalisation of problem gambling (Rosecrance, 1985). An expanding constituency of treatment professionals and researchers has emerged whose livelihoods rest on providing services to governments and gambling operators seeking to address, or to be seen to address, the negative social consequences of legal gambling and present themselves as responsible corporate citizens. Growing resources from national, state and provincial governments have become available to provide services for problem gamblers and their families. In the United States in 1985, there were three states that funded services for problem gamblers and their families. In 1996, 21 states funded an array of services for problem gamblers, including education, prevention and referral; (Cox, Lesieur, Rosenthal & Volberg, 1997). Similar trends have been evident in Australia, Canada and New Zealand, often in association with the completion of prevalence surveys (Volberg, Dickerson, Ladouceur & Abbott, 1996).

A small but growing number of organisations that provide services to these helping professions are investing resources in educating students about gambling and problem gambling, as well as in training and certifying professionals in the treatment of problem gambling. In the United States, for example, there are now three organisations that provide training and certification credentials for treatment professionals interested in diagnosing and treating problem gamblers and their families. Colleges and universities in several states with established gaming executive education programs have added modules on the impacts of problem gambling. A number of insurance companies that serve the casino industry are now willing to reimburse for treatment for problem gambling among casino employees. Finally, there is at least one health care company that plans to establish problem gambling outpatient treatment programs in major gambling markets around the United States (Cox, Lesieur, Rosenthal & Volberg 1997; Jefferson, 1998).

Conceptual Considerations

Underlying all of the existing research on problem and pathological gambling is the assumption that gambling-related difficulties are a robust phenomenon, that is, gambling problems exist in the community and can be measured. Despite agreement among researchers at this fundamental level, as indicated earlier in this section, there is disagreement about the concepts and measurement of gambling-related problems. While this “conceptual and methodological chaos” (Shaffer, Hall & Vander Bilt, 1997, p.8) may be common among emerging and even some mature scientific fields and while this may have some positive aspects, it has led to confusion and uncertainty about how to best measure the impacts of gambling on society.

Like much of science, measurement is a negotiable process. Instrumentation is always a reflection of the work that researchers are doing to identify and describe the phenomena in which they are interested (Volberg, 1983). As research on problem gambling continues, systems for classifying problem gamblers change. The instruments used in the past represent culturally and historically situated consensus about the nature of problem gambling. As research continues and as the definitions of problem gambling change, new instruments and new methods for estimating prevalence in the general population will be developed.

In the late 1980s, the only tool with demonstrated reliability and validity was the SOGS. While the SOGS was originally developed for a single, specific use, it was adopted and adapted by researchers and treatment professionals for a variety of purposes. With limited funding, few

researchers or treatment professionals could allocate resources to test the performance of the SOGS in these new situations. Despite some concerns about the performance of this instrument, it became and remained the *de facto* 'gold standard' in the fields of problem gambling treatment and research until 1994 when the new DSM-IV criteria were published (American Psychiatric Association, 1994).

What led to the growing dissatisfaction with the SOGS? One important change was the rapid expansion of legal gambling which resulted in many people who had never before gambled trying these activities. In its development, the SOGS worked especially well in discriminating members of GA from other groups. However, members of GA in the early-mid 1980s were largely middle-aged, middle-class White men and many were long-term members who had got into difficulties in the 1950s and 1960s (Custer & Milt, 1985; Lesieur, 1984). As legal gambling and patterns of participation have changed, questions arose as to whether a tool that worked well to identify gambling-related difficulties at a particular historic moment continued to work as well. Some investigators raised concerns about the high number of false positives likely to occur when the SOGS is used in community surveys (Abbott & Volberg, 1996a; Culleton, 1989). However, as already mentioned, this is to be expected with any clinically derived screening or assessment device and does not necessarily lead to the production of inflated prevalence estimates as some (e.g. Dickerson et al 1996; Walker 1992) have claimed (Abbott & Volberg, 1992; 1996a; Gambino, 1997).

As legal gambling expanded into new markets and as new types of gambling were promoted to new groups, including the middle classes, women, youth and older people, individuals seeking help for gambling difficulties became increasingly heterogeneous. Prevalence surveys in the early 1990s suggested that growing numbers of women and middle-class individuals were developing gambling problems (Volberg, 1992; 1996a; Volberg & Silver, 1993). Several of the specific items in the SOGS probably make little sense to these new groups of problem gamblers or to the treatment professionals working with them. Indeed, in modifying the SOGS Screen for a survey in Minnesota, the research team stated that "some of these responses (such as loan sharks) probably would not apply to Minnesota respondents" (Laundergan et al, 1990, p. III).

Finally, changing fashions in treatment for mental and substance dependence disorders seem to have focused the attention of treatment professionals and researchers on possible weaknesses of the SOGS. While some researchers contend that the "SOGS includes both subjective and behavioural items, whereas, the DSM has only behavioural items" (Stinchfield & Winters, 1998, p.11), examination of the individual items suggests that the SOGS is largely a behavioural screen while the DSM-IV items are more cognitively oriented. While 15 percent of the 20 SOGS items appear to tap cognitive dimensions, 30 percent of the 10 DSM-IV items appear to tap dimensions of this type. As cognitive therapies become more popular, and particularly since pathological gambling appears to be a peculiarly cognitive disorder, resources have been put into developing instruments with a stronger cognitive focus.

There are alternative approaches now emerging to investigate problem gambling. Some of these approaches spring from efforts to test theories about the psychology of gambling (Dickerson & Baron, 1998). Other approaches issue from the more descriptive work represented by prevalence research. Still others emerge from needs to evaluate clients seeking help for gambling-related difficulties and to determine the effectiveness of different treatment modalities with individuals in treatment (Volberg, 1998a, 1998b).

While there is disagreement and some dissatisfaction with the SOGS, it is questionable whether there is conceptual chaos in the field of gambling research. The concept of a gold standard may indeed be an "idealisation" (Faraone & Tsuang, 1994, p.652). In sociological terms, however, a gold standard exists when a multiplicity of workers concerned with a phenomenon accept at least tacitly that there is a best available measure to identify that phenomenon and adopt that measure in their daily work.

Most researchers and treatment professionals working with issues of problem and pathological gambling have expressed satisfaction with the new DSM-IV criteria and appear willing to adopt these criteria as the new gold standard in the field. At a recent international meeting of gambling researchers in Las Vegas,[1] the consensus was that the field needed to move fully into the new "DSM-IV era." Researchers in New Zealand, Sweden, Norway and the Netherlands are also ready to adopt the DSM-IV criteria as the new gold standard against which other instruments must be measured.

To enable the field of gambling research to move forward in an evolutionary way, it is essential that the performance of any new screen be assessed in relation to existing and accepted measures. The greatest advantage to using the SOGS in population-based research of problem gambling prevalence to date has been the comparability across jurisdictions that comes with this tool (Walker & Dickerson, 1996). The instrument or derivations of it have been used in population-based research in nearly 20 states in the United States, most of the Canadian provinces, Australia, New Zealand, Norway, Sweden and Spain. The internal consistency of the SOGS and SOGS-R is high across these cultures and even across languages (Abbott, Rönnberg & Volberg, 1997; Volberg & Vales, 1998).

Certainly, there are limitations to the SOGS. From a research standpoint, the greatest weakness is that the performance of this screen has received only modest formal evaluation in general population settings. However, if the DSM-IV criteria become a new gold standard, this weakness may become moot. A greater concern now is to determine how the SOGS performs vis-à-vis the DSM-IV criteria as well as other, DSM-IV based tools. Without such cross-validation, it will be impossible to calibrate all of the research based on the SOGS and SOGS-R through the 1980s and 1990s with emerging standards that will probably be adopted early next century.

From an intellectual perspective, we know that the SOGS works well in clinical settings and somewhat less effectively in survey research. We know that the SOGS-R, which measures both lifetime and current prevalence, works well in population research although the two prevalence measures serve different purposes. Finally, we believe that many of the new, DSM-IV based instruments will probably work quite well both in clinical settings and in survey research. However, what we lack is a well-tested DSM-IV screen for population research purposes. We also lack cross-validation studies of the SOGS and SOGS-R and many of the new tools that have emerged to assess gambling difficulties. Finally, we lack longitudinal research that can inform us about the stability of our classification systems over time. Most of these issues are being addressed in the New Zealand Gaming Survey or in projects underway elsewhere internationally.

International Overview

There is a rapidly growing body of literature on the prevalence of problem gambling and the characteristics of problem and pathological gamblers. However, due to the recent nature of much of this work as well as the small number of studies that have been published in scholarly journals, there have been few attempts to synthesise this literature and review the results from multiple studies.

In 1996, the *Journal of Gambling Studies* devoted an entire issue to prevalence surveys of problem gambling. This review, edited by Volberg and Dickerson (1996), included articles on prevalence research in the United States, Canada, New Zealand, Australia and Europe. The issue also included an article that described a meta-analysis of research on adolescent gambling problems, another reviewing treatment and prevention service developments internationally, and a critical review of the field of problem gambling research.

As indicated above, in 1997, a meta-analysis of prevalence studies of problem gambling in North America was funded by the industry group, the National Center for Responsible Gaming, and published by Harvard Medical School (Shaffer, Hall & Vander Bilt, 1997). The purpose of this

[1] This one-day meeting brought together Alex Blaszczynski (Australia), Iain Brown (Scotland), Sue Fisher (Britain), Angels Gonzalez (Spain), Joanna Franklin, Henry Lesieur, Richard Rosenthal, Lori Rugle and Rachel Volberg (U.S.A.) for an international gambling treatment think tank.

project was to establish more precise estimates of the prevalence of problem or disordered gambling and identify factors that may influence these rates. The investigators identified 152 studies, representing adults, youth, college students, adults and youth in treatment or prison settings, and a variety of other populations.

The major conclusions of this meta-analysis were that "disordered gambling" is a robust phenomenon, that the majority of North Americans gamble with few adverse consequences, that gambling disorders have increased among adults in the general population but not among adolescents or among adults in treatment or in prison, and that gambling disorders are more prevalent among youth, males, and those with concurrent psychiatric problems. Finally, the meta-analysis found no significant regional variation in the rates of gambling disorders across North America, even between those with contrasting access to gambling facilities (Shaffer, Hall & Vander Bilt, 1997).

Evaluative Criteria

Shaffer, Hall & Vander Bilt (1997) devised an evaluative template that they applied to each of the studies selected in their meta-analysis. The criteria included were as follows:

- Sample selection process (i.e. randomly selected sites and/or respondents)
- Response rate (including the appropriateness of the method used to calculate the response rate)
- Survey anonymity (not applicable for treatment or prison samples)
- Whether the study underwent a peer review process (e.g., for publication in a refereed journal)
- Whether the authors assessed the reliability of their data collection and entry procedures
- Whether the authors varied the time of day survey data was collected (for household surveys)
- The number of respondents in the study sample
- Whether the authors took a multidimensional approach to measuring disordered gambling (e.g. multiple dependent measures)
- Whether the study was intended primarily as a prevalence study.

It was found that the quality of the North American studies, assessed by these criteria, varied considerably but was generally poor. For example, over a third did not report a response rate and over half of those that did either calculated it incorrectly or did not specify how it was calculated. When overall quality scores for each study were plotted over time, it was concluded that there had not been an improvement in methodological quality during the past 20 years. Only 40 percent of the 120 studies selected for inclusion in the meta-analysis had appeared in peer-reviewed publications. This percentage would have been lower if the 32 omitted studies had also been included.

Contrary to the authors' expectations, they did not find a significant relationship between methodological quality and prevalence estimates. From this, the authors concluded that disordered gambling is a reliable and robust phenomenon, "relatively impervious to some of the weaknesses inherent in many of the research designs reviewed in this study" (p.61). They also failed to find significant differences in prevalence rates between published and unpublished studies. This latter finding is important given the potential, noted in Section One, for this differential reporting or 'file drawer' phenomenon to produce serious bias in bodies of scientific literature.

Europe

Despite the expansion of legal gambling in Europe in the 1980s and 1990s, very few general population surveys have been conducted. The earliest prevalence research in Europe was carried out in Spain. By 1996, five prevalence surveys had been completed in different regions of Spain, including Catalonia, Seville, and Galicia (Becoña, 1996). The studies in Catalonia and Seville were based on the SOGS (Cayuela & Guirao, 1991; Legarda, Babio & Abreu, 1992). The surveys in Galicia were carried out by clinical interviewers who used the DSM-III-R criteria to identify

respondents as problem or pathological gamblers (Becoña, 1991; 1993). A third survey in Galicia used the SOGS to identify respondents as problem or probable pathological gamblers (Becoña & Fuentes, 1994). The results of these surveys show that "the prevalence rates of problem and pathological gambling [in Spain] are equal to or higher than in other countries … [with] the highest prevalence rates … among slot machine players" (Becoña, 1996, pp.189-190).

Efforts to conduct prevalence research in the United Kingdom have only recently met with success. Although the government has sought proposals to conduct prevalence research in the United Kingdom since 1994, none of these proposals has yet been funded. However, the British Casino Association financed a study of gambling and problem gambling among casino patrons in 1996 (Fisher, 1996). More recently, the government funded a study of gambling and problem gambling among 12- to 15-year-olds in England and Wales (Fisher, 1998). Fisher developed adult and adolescent screens based on the DSM-IV criteria for pathological gambling for use in these surveys. Her careful investigation of the psychometric properties of these screens suggest that the Fisher DSM-IV Screen and the Fisher DSM-IV-J (for juvenile) Screen are valid and reliable instruments for identifying individuals with gambling difficulties in Great Britain.

In 1997, a proposal to conduct a large two-phase prevalence study in Sweden was funded (Rönnberg, Abbott & Volberg, 1996). Data collection for the first phase of the study, a telephone and mail survey of approximately 10,000 Swedish residents carried out by Statistics Sweden, was completed in 1998 (Rönnberg, Abbott & Volberg, 1998). The questionnaire for the Swedish survey included both the SOGS-R and the Fisher DSM-IV Screen. The SOGS-R lifetime prevalence was 1.2 (±0.25 CI) percent for probable pathological gambling and 2.7 (± 0.4 CI) percent for problem gambling. Current prevalence estimates were 0.6 (± 0.2) percent and 1.4 (± 0.3) percent respectively (Rönnberg et al, 1999).

The second phase of the Swedish project involves face-to-face interviews by clinical psychologists with approximately 500 respondents selected from the phase one sample. The majority of these respondents will be individuals who score as lifetime problem or probable pathological gamblers. Data collection for this part of the project will be completed in 1999.

North America

As mentioned earlier, until recently there had been only one national prevalence survey conducted in the United States, namely Kallick et als' mid-1970s study. Although the procedure used to measure compulsive gambling in this survey has been seriously challenged (Nadler, 1985), it provided the first prevalence estimates of this disorder internationally. The overall prevalence of "probable compulsive gambling" was deemed to be 0.77 percent (1.1% for males; 0.5% for females). A further 2.3 percent were classified as "potential compulsive gamblers". For the state of Nevada, the "probable compulsive gambler" prevalence was much higher than the national average, namely 2.5 percent (3.3% for males; 2.0% for females). Based largely on (a) the strong relationships that they found between exposure to gambling and gambling participation and (b) the problem gambling differences between Nevada and the rest of the country, the authors concluded: "the data tend to support the contention that the widespread legalisation of gambling in the nation may result in a significant increase in the incidence of compulsive gambling" (p.xiii).

The preliminary findings of the second national survey have recently been released (National Opinion Research Centre, 1999a). Based on the NODS instrument mentioned earlier, the lifetime prevalence of probable pathological gambling was 0.8 percent and the past year equivalent was 0.6 percent. Corresponding problem gambling estimates were 1.3 percent and 0.4 percent respectively. After weighting additional data from a patron survey and adding these respondents to the data base, the National Opinion Research Center issued revised lifetime prevalence estimates. These revised results show that 1.2 percent of the combined national telephone survey and patron survey pool scored as probable pathological gamblers and an additional 1.5 percent scored as problem gamblers.

It is possible that the 1998 national sample and hence prevalence estimates were biased by limiting the administration of the screen to only those respondents who acknowledged losing money gambling. The low response rate (55.6% unweighted) also raises concerns regarding possible bias. This response rate was, however, similar to that of the earlier national survey (53.6% unweighted; 62.2% weighted). Because the measures used to assess problem and probable pathological gambling in the two national surveys were very different it is not possible to compare them to determine whether or not disordered gambling has increased across the United States since the mid 1970s. Until performance on the NODS is validated using independent DSM-IV clinical assessment and compared with performance on the SOGS-R, it is also not possible to make meaningful comparisons with other prevalence studies conducted in the United States or other parts of the world. It does, however, provide potentially useful national baseline data. Within group differences are also of considerable interest, albeit somewhat constrained by the relatively small sample size and hence wide margins of error.

Relatively little information was provided on the youth (16- and 17- year-old) NORC sample. The response rate was not published in the main report although this information will be available in one of the many appendices. Using the same criteria applied to adults, including the requirement for a reported loss of US$100 in a single day or over a whole year, it was found that approximately 1.5 percent were problem or pathological gamblers, somewhat less than the adult rate. However, the reported monetary loss requirement for 16- and 17-year olds would appear overly restrictive. When this requirement is removed, approximately 3.0 percent received a problem or pathological classification. Although the report authors say this is equivalent to the adult percentage, comparison with the reported adult figure (2.7%) suggests that it is in fact higher. However, given the small youth sample size and complexity, it is unlikely that this apparent difference would be statistically significant. Of potential significance is the finding that about 15 percent of the youth sample reported having experienced one or two problems (at risk gamblers). The adult equivalent was reported as 7.7 percent.

Since 1985, numerous prevalence studies have been conducted among adults in various states and provinces in North America. There have also been studies of problem gambling prevalence among adolescents, university students and individuals in treatment or prison settings. As already indicated, the recent Shaffer et al meta-analysis identified 152 studies of “disordered gambling” in North America.

The majority of these studies were of adults and there were approximately twice as many adolescent studies as studies of university students. Studies of problem gamblers in treatment or prison formed the smallest group. Over two-thirds of the adult surveys had used some variation of the SOGS to identify respondents as problem or probable pathological gamblers. Five of these studies used some variation of the DSM-IV criteria and two studies used the Diagnostic Interview Schedule (DIS) which, as indicated above, is also based on DSM-IV criteria. Among the adolescent studies, two-thirds used the adolescent version of the SOGS or a variant, five were based on the Massachusetts Gambling Screen and the rest used the DSM-IV criteria. Three-quarters of the college student surveys and four-fifths of the surveys of treatment and prison populations used the SOGS.

As mentioned earlier, analysis of the performance of the SOGS shows that while lifetime prevalence figures are useful in predicting the characteristics of individuals who develop gambling problems, current prevalence figures are more accurate and therefore more useful in identifying the number of individuals in the population presently experiencing gambling problems (Abbott & Volberg, 1992; 1996a). Table Three displays information about the past year prevalence of problem and probable pathological gambling from surveys utilising the SOGS-R in the United States and Canada. Virtually all of these surveys used telephone interviews, sometimes supplemented by face-to-face interviews. From their meta-analysis of a large sample of North American adult general population prevalence studies, Shaffer, Hall & Vander Bilt (1997), obtained a mean current probable pathological gambling rate of 1.14 (0.90-1.38 CI) and mean current problem rate of 2.80 (1.95-3.65). Similar rates were

Table Three: Current Problem and Probable Pathological Gambling Prevalence Rates in North America

Year	State/Province	Current Problem %	Current Prob/Path %	Current Total %
1990	Minnesota	1.6	0.9	2.5
1991	South Dakota	0.8	0.6	1.4
1992	Washington State	1.9	0.9	2.8
1992	North Dakota	1.3	0.7	2.0
1992	Montana	1.5	0.7	2.2
1992	Texas	1.7	0.8	2.5
1993	South Dakota	0.7	0.5	1.2
1994	Minnesota	3.2	1.2	4.4
1994	Georgia	1.5	0.8	2.3
1995	Texas	2.2	0.8	3.0
1995	Iowa	2.3	1.0	3.3
1995	Louisiana	3.4	1.4	4.8
1996	Connecticut	2.2	0.6	2.8
1996	Mississippi	2.8	2.1	4.9
1996	New York	2.2	1.4	3.6
1997	Oregon	1.9	1.4	3.3
1997	Michigan	2.1	1.3	3.4
1997	Colorado	1.8	0.7	2.5
1998	Louisiana	2.3	1.6	3.9
1998	Montana	1.9	1.3	3.2
1998	Washington State	1.8	0.5	2.3
1992	New Brunswick	3.1	1.4	4.5
1993	Manitoba	2.9	1.3	4.2
1993	British Columbia	2.4	1.1	3.5
1994	Alberta	4.0	1.4	5.4
1994	Saskatchewan	1.9	0.8	2.7
1995	Manitoba	2.4	1.9	4.3
1995	New Brunswick	1.9	2.2	4.1
1996	British Columbia	2.8	1.1	3.9
1997	Alberta	2.8	2.0	4.8

obtained when they confined their analysis to studies that used the SOGS-R and related current SOGS measures. The corresponding adolescent rates were 5.77 (3.17-8.37) and 14.82 (8.99-20.66).

Surveys of problem and probable pathological gambling have now also been replicated in a substantial number of North American jurisdictions. Three of these studies, in Iowa, New York and Quebec, were only able to measure changes in lifetime prevalence since this was the only measure used in the baseline studies. All three of these studies, conducted six years, seven years and ten years after the baseline studies, identified statistically significant increases in the lifetime prevalence of problem and probable pathological gambling (Volberg, 1995; 1996b; Jacques et al, 1997). Shaffer, Hall and Vander Bilt (1997) also considered this issue by comparing surveys conducted from 1977 to 1993 with those undertaken from 1994-1997. The mean lifetime combined (problem and probable pathological) rate was 4.38 for the earlier studies and 6.72 for the latter studies. This difference was statistically significant.

Like the replication survey currently under way in New Zealand, a substantial number of North American jurisdictions have funded replication studies that have been able to assess changes in current as well as lifetime prevalence of problem and probable pathological gambling. Table Four shows changes in the prevalence of past year problem and probable pathological gambling in jurisdictions where current prevalence figures were collected at baseline and replication. The table is arrayed by the interval of time between the baseline and the replication studies.

From Table Four, it is evident that in jurisdictions where replication studies were done two and three years after the baseline study, very little change is found. In jurisdictions where replication studies have been carried out four to six years after the baseline study, significant changes in past year prevalence have been identified in two of the three cases. In Minnesota, the increase in problem gambling was statistically significant. In Montana, the increase in probable pathological gambling and combined problem/probable pathological prevalence rate were both statistically significant. On the other hand, in Washington State there appears to have been a decrease in the probable pathological gambling prevalence. However, as these surveys used complex designs, the confidence intervals associated with each estimate will be larger than has been assumed. Consequently, while there appears to be some pattern in these changes over time, a degree of caution is required in their interpretation.

Another interesting observation based on Table 4 is that while combined prevalence rates may not change appreciably in short periods of time, there can be substantial changes in the proportion of problem to probable pathological gambling. For example, probable pathological gamblers represent 31 percent of the overall prevalence rate in Manitoba in 1993 but 44 percent of the overall prevalence rate in 1995. In New Brunswick, probable pathological gamblers represent 31 percent of the overall prevalence rate in 1992 and 54 percent in 1995.

Shaffer, Hall & Vander Bilt (1997) found that past year probable pathological rates averaged 0.84 for surveys undertaken before 1993 and 1.29 for those carried out after 1993. As with the lifetime mean rates, this difference was statistically significant. Taken together, these bodies of data suggest that prevalence rates have increased over time in North America. However, significant change is not found in replication studies where the gap between surveys was less than four years.

Table Four: North American Current Problem and Probable Pathological Gambling Prevalence Rates at Baseline and Replication

Year	State/Province	Current Problem %	Current Prob/Path %	Current Total %	Ratio
1991	South Dakota	0.8	0.6	1.4	43
1993	South Dakota	0.7	0.5	1.2	42
1993	Manitoba	2.9	1.3	4.2	31
1995	Manitoba	2.4	1.9	4.3	44
1992	Texas	1.7	0.8	2.5	32
1995	Texas	2.2	0.8	3.0	27
1992	New Brunswick	3.1	1.4	4.5	31
1995	New Brunswick	1.9	2.2	4.1	54
1993	British Columbia	2.4	1.1	3.5	31
1996	British Columbia	2.8	1.1	3.9	28
1994	Alberta	4.0	1.4	5.4	26
1997	Alberta	2.8	2.0	4.8	37
1995	Louisiana	3.4	1.4	4.8	29
1998	Louisiana	2.3	1.6	3.9	41
1990	Minnesota	1.6	0.9	2.5	36
1994	Minnesota	3.2	1.2	4.4	27
1992	Montana	1.5	0.7	2.2	32
1998	Montana	1.9	1.3	3.2	41
1992	Washington State	1.9	0.9	2.8	32
1998	Washington State	1.8	0.5	2.3	22

Australia

A number of state level problem gambling prevalence surveys have been conducted in Australia in recent years, the great majority by the Australian Institute for Gambling Research. As was evident in Section Two, these studies also examined gambling participation, often in considerable detail. Summaries of participation and expenditure data and comment on aspects of the methodology used in this research were provided in that section.

In addition to these state level surveys, as mentioned, an earlier study was also undertaken in four state capital cities. Although referred to as a national study, respondents in this 1991 study were drawn from Sydney, Melbourne, Adelaide and Brisbane (Dickerson, Baron, Hong & Cottrell, 1996). This pioneering study will be discussed first, in part because it contains information of relevance and interest, and in part because the methodology used provided the model that was adopted in most of the subsequent Australian surveys. This year, a true national survey has been completed for the Productivity Commission review. The final report on this survey will be examined in the NZGS report on phase one of the New Zealand prevalence survey.

In the 1991 Australian survey, the 2,744 participants from the four major cities were recruited using a stratified random door-knock approach. The survey was presented to potential participants as a study of leisure activities. People who agreed to be interviewed were administered a brief structured interview concerning their leisure activities, gambling participation and sociodemographic characteristics. Respondents who reported gambling once a week or more often on a continuous form of gambling were asked to proceed with two additional sections of the questionnaire. A "quota" of weekly or more non-continuous gamblers was also asked to continue. An A$1,000 cash prize was used as an incentive for recruitment. The resulting sample consisted of 195 people who gambled on continuous forms and 95 who gambled on non-continuous forms.

Response rates were not reported for either the phase one or phase two respondents in the published report. However, the authors indicated that the phase one regular continuous gamblers were more than three times as likely to refuse to continue with the second phase than were the regular non-continuous gamblers. Elsewhere (Australian Institute for Gambling Research, 1994) it is stated that 29.7 percent of regular continuous gamblers refused to complete the second part of the survey compared with 4.2 percent of the regular non-continuous phase one respondents. This ratio of differential responding is far higher than the "more than three times" mentioned in the 1996 account. Either way, it is probable that this high overall refusal rate combined with differential responding would have introduced serious bias to the sample.

The second phase of the survey incorporated measures based closely on those used earlier in the New Zealand national study. They included a modified version of the SOGS (designed to yield both lifetime and past six month prevalence estimates), forty-seven items intended to assess various positive and negative effects of gambling, the General Health Questionnaire, the Beck Depression Inventory, the Sensation Seeking Scale and a new instrument referred to as the Scale of Gambling Choices. The two latter instruments were not included in the New Zealand study. The SOGS-R also differed from the original used in New Zealand in that it adopted a five-point response format.

Dickerson et al (1996) reported that using the customary SOGS cut-off of five or greater, the lifetime prevalence estimate for probable pathological gambling was 7.07 percent and the current (6 month) estimate was 13.39 percent. Confidence intervals were not provided for these estimates. However, irrespective of the size of the margins of error, these estimates are substantially higher than those obtained in any previous or subsequent adult general population survey.

The estimates are also paradoxical in that the current estimate was reported to be higher than the lifetime estimate. This could not occur with the usual administration of the SOGS-R where respondents are only asked the question in the current (6 or 12 month) time frame if they first give

a positive response to its lifetime equivalent. Presumably, if the findings are reported correctly, some other method of presentation was used. If so, it still remains unclear how this result could have come about.

Although very high prevalence rates are reported for the Australian 'four city study', there are a variety of reasons why this survey would have been expected to under-estimate lifetime prevalence. A lower lifetime estimate could be expected because the SOGS-R was only administered to weekly gamblers, thus excluding pathological gamblers who had a gambling problem in the past but currently gambled less than once a week. Preliminary findings from longitudinal research currently underway in New Zealand indicate that this is a relatively large percentage of those who once reported problems. In addition, pathological gamblers in treatment or involved with GA may conceivably have declined to participate because of the A$1,000 'lottery' used to encourage phase two recruitment. While these factors may partially explain the size of a difference between current and lifetime estimates, they could not account for the reversal that is under discussion.

A more recent reference to the 1991 Australian survey (Dickerson, McMillen & Hallebone et al, 1997) reports that the current probable pathological figure was 6.6 percent rather than 13.39 percent. This suggests that the original figure was incorrectly calculated or reported. It is still very high by international standards but is lower than the 7.07 percent lifetime prevalence reported in the 1996 article. The lifetime figure is somewhat closer to lifetime rates reported elsewhere. Typically, lifetime rates are approximately double current rates. However, as indicated, there are methodological reasons why the lifetime-current difference would be expected to be less in the study under discussion.

In addition to the likely effects of the differential responding already mentioned, the decision to confine the administration of the SOGS-R to weekly gamblers could be expected to generate lower current as well as lifetime prevalence estimates. As the authors acknowledged, this methodology would not pick up pathological gamblers of the episodic or binge variety. However, this effect is likely to be small compared to that of another procedure employed by the investigators, not in the design but in the calculation of prevalence estimates. This concerns the decision to exclude weekly non-continuous gamblers from the prevalence calculations. Again this could be expected to reduce both the current and lifetime prevalence estimates.

Although only a relatively small number of pathological gamblers report non-continuous varieties of gambling as their preferred form, many regular non-continuous gamblers participate less frequently in continuous forms that have been found to have a stronger association with problem gambling. Significantly, however, as shown in Part Two of this review, this non-continuous group makes up the great majority of regular gamblers and a substantial part of the general population. For this reason, even if a low percentage of respondents who experience serious gambling problems are in this category, their omission would be expected to significantly deflate the overall population estimates. The authors acknowledge that this, along with a number of other aspects of their methodology and analysis, are likely to make their estimates conservative. However, in our view, this omission is likely to have resulted in additional bias.

From the foregoing, while the prevalence estimates derived from the 1991 Australian survey were higher than those reported anywhere else in the world where the SOGS or SOGS-R have been used in general adult population surveys, it is evident that there are a number of reasons why these estimates are likely to be conservative. The investigators, however, introduced procedures that reduced them further. The reasons given for this included the investigators' belief that the SOGS is likely to generate high numbers of false positives when used in community surveys and observation that the A$58 mean reported weekly expenditure of their probable pathological sample was low relative to what people in treatment typically report. Elsewhere, they have stated that instruments like the SOGS that have been developed in countries with less tolerance towards gambling and lower participation rates, are likely to be over-sensitive when used in Australia (Dickerson, McMillen & Hallebone et al, 1997).

In addition to the measures described above, further reduction in the prevalence rates was achieved by seeking to "…'anchor' the final Australian group of highly problematic gamblers with a group identified in New Zealand by Abbott and Volberg (1992)" (p.169). This was the group of phase two New Zealand respondents who were identified as "true pathological gamblers" by interviewer DSM-III-R ratings. The two groups were aligned by comparing their responses on a number of SOGS items. The investigators then looked at the SOGS-R scores in the Australian sample and found that a cut-off of ten or more differentiated this most problematic ("aligned") group from other respondents. Using this higher cut-off score, the current probable pathological prevalence rate was recalculated as 1.16 percent (±0.34% CI). They further noted that this was similar to the New Zealand current estimate of 1.17 percent (±0.33% CI) and concluded:

> given the legal availability of a similar mix of gambling and gambling products and a general social acceptance of gambling in both countries, the similarity of the prevalence rates has good face validity. In addition, in both studies the pathological/problem gamblers preferred continuous forms of gambling, i.e., off-course betting and gaming machines, and were more likely to be males under 30 years of age (p.175).

We believe there are flaws in the line of reasoning followed by Dickerson and his colleagues (Dickerson, Baron, Hong & Cottrell, 1996; Dickerson, McMillen & Hallebone et al, 1997). First, A$58 expenditure per week on gambling may not be much to a highly paid professional or executive. However, if this refers to net expenditure, it is quite a substantial sum for Australians who are beneficiaries or on low incomes. People in this situation are significantly over-represented in Australian problem gambling samples. Additionally, research in Queensland suggests that gambling problems are likely to be associated with gambling expenditure in excess of A$50 per week (Queensland Department of Family Services and Aboriginal and Island Affairs, 1995). Furthermore other research, including some Australian research cited in Section Two, indicates that survey respondents generally under-report gambling expenditure. This characteristic is probably even more pronounced among problem gamblers. Indeed, "lies to family members, therapists or others to conceal the extent of involvement with gambling" is one of the diagnostic criteria for pathological gambling. Comparing people in treatment to respondents met for the first time in an interview situation does not seem a valid comparison. In treatment, the therapist, other patients or family members may confront patients about their gambling expenditures. Patients have also made the decision to seek professional help, at least partially because they recognise that they have a gambling problem and have resolved to make changes in their lives. Even with this background, it often takes many sessions before the full extent of gambling losses are disclosed.

A further difficulty is that there were, in fact, no respondents in the New Zealand interviewer-rated reference group used to determine the higher cut-off that scored 10 or more on the current SOGS-R measure. Indeed, use of the Australian logic and cut-off would mean that there were no pathological gamblers in New Zealand in 1991. Further more, over half of the New Zealand reference group actually scored less than five on the SOGS-R. There is little "face validity" if Australia and New Zealand are compared and the latter has a zero current prevalence of probable pathological gambling.

Third, while there are some similarities between Australia and New Zealand with respect to social attitudes towards gambling and gambling participation, as indicated in Section Two, per capita gambling expenditure in New Zealand is substantially lower than that of any of the Australian states. This difference was even greater in 1990-1991. If there was a link between per capita expenditure on gambling and the prevalence of problem gambling, it would be expected that Australia would have higher rather than similar rates to New Zealand.

Fourth, while there is some support for the notion that the lifetime SOGS produces a high rate of false positives in community surveys, there are also indications that the rate is very much lower for the six months version (Abbott & Volberg, 1992). The reduction made to the current prevalence estimate in the Dickerson, Baron, Hong & Cottrell (1996) report by changing the cut-off score was many times greater than would be required to account for false positives.

Fifth, Dickerson et al take no account of false negatives in their prevalence revisions. When the SOGS-R was first developed and examined with a community sample, it was found that the lifetime measure produced only a small number of false negatives - people who are pathological gamblers but are not identified as such by the screening test. However, the current measure actually generated more false negatives than it did true positives - pathological gamblers who are correctly classified by the test (Abbott & Volberg, 1992). Concern about this high rate of misclassification with the six months version resulted in it being abandoned in favour of a past 12 months current measure in the post 1992 versions of the SOGS-R that have been used widely in North America and other parts of the world. This high rate of false negatives was not mentioned by Dickerson et al. In other words, they focus on the people who were included when they should not have been but overlook those who should have been included but were not. This is a serious omission, as Gambino (1997) explains:

> The argument that the SOGS overestimates prevalence because it generates excess false positives represents an incompletely specified logical mode. While false positives are a necessary condition for overestimation, they are not a sufficient condition. It must also be the case that false negatives are not equal to or greater than the number of false positives (p.346).

Gambino continues:

> The relevant research question is to assess the relationship between the observed prevalence (proportion) of positive tests Pp, and the true prevalence, P. Is the difference Pp - P equal to, greater than, or less than zero? The evaluation of this relationship asks the question is the sample estimator unbiased or biased, and if the latter, in which direction? Bias is defined as the amount by which errors tend to be made more in one direction than the other (e.g., underestimation versus overestimation). When there are more false positive errors than false negative errors, bias is in the direction of overestimation. When there are fewer false positives than false negatives, bias is toward underestimation. When false positives equal false negatives, then Pp, our sample estimate, is an unbiased estimator of P, the true prevalence (p.346).

As indicated, there is reason to believe that the six months version of the SOGS-R produces substantial numbers of false negatives. This means that the initial Australian estimate is probably an underestimate rather than an overestimate as Dickerson et al assumed and the subsequent downward revision is likely to significantly amplify this underestimation.

In summary, there are a variety of reasons to conclude that the Australian 'national' study understated the prevalence of serious gambling related problems. The authors' practice of referring to pathological gamblers and probable pathological gamblers with SOGS-R scores of five to nine as being "at risk" and those with scores of ten or more being "problem gamblers" also has the effect of down-playing the seriousness of gambling-related pathology. Investigators in other countries generally refer to people with SOGS scores of three or four as "problem gamblers". In Australia, they are referred to as a "no risk" group (Dickerson, McMillen & Hallebone et al, 1997). Apart from being incorrect and misleading, this designation of people reporting sub-clinical levels of gambling-related problems is paradoxical.

It is a paradox to refer to this category as "no risk" because a major thrust of the 'harm minimisation' approach within which the Dickerson et al conceptualisation of gambling problems is embedded, involves recognition of the fact that in many areas, such as alcohol use, the major health and social costs are actually generated by people who do not meet diagnostic criteria for misuse or dependency. The major reason for this is that although people in this sub-clinical category are much less likely to experience problems, especially serious problems, this group is many times larger than the 'clinical' group. As a consequence, in aggregate, their problems and the costs flowing from them are of greater magnitude. One implication of this, and a reason why harm minimisation advocates ostensibly are critical of diagnostic case finding approaches, is that they divert attention from this larger group. There is some merit in this line of thinking from a broader

public health perspective. For example, if prevention programmes were exclusively confined to preventing disorders such as alcohol dependence or pathological gambling, they would not reach the people who actually account for the majority of gambling-related problems and costs within the community. This phenomenon is well recognised within public health. Ironically, in the present context, it is known as the 'prevention paradox'.

The 1991 Australian four city study has been discussed at some length because most of the Australian state-level surveys used the same methodology and all of them employed the higher cut-off score and same classification system. A slight qualification needs to be made to this statement in that a modification to the method used to calculate prevalence estimates was made in the 1995 New South Wales survey (Dickerson, Allcock & Blaszczynski et al, 1996). The two-phase door knock procedure was also superseded by telephone surveying in the more recent studies, partly for cost reasons, but also because of the consistency of results obtained using this approach in North America and concern about the high refusal rates in the previous Australian door knock surveys.

The modification to the method of calculating prevalence estimates was made because of the realisation that a substantial number of respondents scoring five to ten on the SOGS-R are likely to be true positives and that their omission was not justified. This was one of the criticisms mentioned above. The anchoring procedure was replaced by examining the distribution of SOGS-R scores of a sample of 82 pathological gamblers attending a specialist treatment centre (Dickerson, Allcock & Blaszczynski et al, 1996). These data were claimed to provide support for retaining the cut-off of ten or more. However, as the authors themselves acknowledge, a cut-off of seven would still have correctly classified 97 percent of the sample. The present reviewers see no justification for choosing ten rather than seven. The next step taken is perhaps best expressed in the authors' own words:

> scores of 10 or more are associated with an insignificant level of false positives. In other words, a respondent scoring 10 or more is very unlikely not to be a problem gambler. Nevertheless, scores below 10 can be considered to provide an indication that the respondent is increasingly likely to be at risk of experiencing severe gambling related problems in their life. Based on the above SOGS data base and the team's expert opinion, it was agreed that scores between 7-9 would correctly include 50% of those at risk (i.e. 50% true positives), and scores 5-6 would correctly include 20% of those at risk (p.52).

How the "SOGS data base" justifies this decision is unclear. However, whatever its justification or validity, this approach ignores the fact that increasing the cut-off in this way also greatly inflates the number of false negatives. As has been explained above, an increase in false negatives has significant implications for prevalence estimation.

It is normal practice when developing clinical screening tests to very carefully consider and weigh the benefits of increasing cut-off scores against the cost of more false negatives. This is best accomplished by using Receiver Operating Characteristic (ROC) analysis which enables optimum cut-off scores to be determined for different circumstances (Metz, 1978). For prevalence studies the optimum cut-off would certainly not be one that produced no false positives and a large number of false negatives. This would be a guarantee for the production of grossly understated estimates. As mentioned previously, the optimum cut-off for use in prevalence studies would produce a balance of false positives and false negatives.

The six month prevalence estimates for the Australian state-level surveys are provided in Table Five. Rather than using either of the Australian calculation methods, the procedure used in other parts of the world was employed.

For reasons outlined above, the survey methodology employed in these surveys, especially the door knock procedure, would still be expected to generate lower estimates than the North American

surveys that administered the SOGS-R to all respondents and used a 12 rather than six month time frame.

The prevalence estimates provided in Table Five have been derived from the most recent accounts of the Australian state surveys, rather than the original reports. The methodology of the four city study is outlined above. Information regarding the other surveys is given in Section Two where it was noted that the survey reports often lack important details including response rates and full descriptions of the samples and how they were weighted prior to analysis. Another problem with the Australian surveys is that a variety of different adaptations of the SOGS-R were used, further complicating comparison across the different surveys.

It should be mentioned that the prevalence rates for some surveys vary in the different accounts of them. Without access to the raw data, it is not known for certain which, if any, are accurate. It is assumed that the most recent account is correctly calculated and reported. In addition to the surveys included here, four further surveys have been conducted in Victoria. Three (AGB McNair, 1992; 1994; DBM Consultants, 1995) are not included because an unvalidated series of items without a time frame was used to assess gambling problems. The fourth (Victorian Council on Problem Gambling, 1996) is omitted because of the small sample size and lack of information regarding the score distribution.

In addition to the current prevalence estimates, Table Five includes information on the year each survey was conducted, the method used (two-phase door knock or telephone interview) and the rate for respondent reports of gambling-related problems among close family members during the past six months. Per capita state gambling expenditure in the year each survey was undertaken is also provided.

Table Five: Current Prevalence Rates for Probable Pathological Gambling in Australia, Family Members Experiencing Difficulty with Gambling and Per Capita Expenditure on Gambling

Year	State/Area	Method	Current Prob/Path	Family Member Problems	Per Capita Expenditure $A
1991	Four Cities	D	6.6	-	-
1994	Tasmania	D	1.1	1.1	425
1996	Tasmania	T	2.8	2.3	421
1994	WA	D	0.6	2.2	547
1996	NSW	D	2.2	3.8	720
1996	SA	T	1.2	4.0[a]	526
1997	Victoria	T	0.7	2.4	681

[a] The question assessing family member problems was asked in a different way to the other studies and may not be comparable.
D doorknock
T telephone

What can be concluded from the Australian prevalence rates? Two of the seven estimates are higher than those from any of the North American surveys and a third is equal to the highest North American estimate. This is consistent with what might be expected given the much higher levels of gambling involvement and expenditure in Australia relative to the North American jurisdictions. The consistency is even greater considering that the methodology used in the Australian surveys is likely to generate lower estimates than would be the case if the procedures generally used in North America were employed. The remainder fell within the range of the North American studies.

There appears to be some relationship between the prevalence rates and respondent reports of gambling problems among close family members. However, neither the prevalence estimates nor the family problem rates have an obvious relationship to per capita gambling expenditure.

Dickerson, McMillen & Hallebone et al (1997) present data suggesting that there is a relationship between problem gambling and state per capita expenditure when consideration is confined to respondents who score ten or more on the current SOGS-R. They argue that this supports the

construct validity of this higher cut-off point to define "problem gamblers". However, they did not include the most recent survey findings from Victoria. When the SOGS-R 9+ 0.1 percent prevalence estimate from that survey is entered, along with Victorian per capita gambling expenditure for the year the survey was conducted, the pattern breaks down. Victoria had the second highest expenditure but lowest prevalence estimate. Similarly, Dickerson, McMillen & Hallebone et al (1997) present data that strongly suggests a relationship between reports of family members currently experiencing "difficulties with excessive gambling" and state per capita gambling expenditure. As with the SOGS-R 9+ defined "problem gambler" group, this also breaks down when the findings from omitted surveys are included (Tasmania 1994, South Australia 1996 and Victoria 1997) (refer to Table Five).

Insufficient surveys have been completed in Australia to be able to comment on possible changes in prevalence over time. The high prevalence rate (when assessed using conventional cut-off scores) for the 1991 four-city study relative to the state surveys may have arisen, in part, because it was confined to major metropolitan areas. There is evidence for much higher prevalence rates in urban than in non-metropolitan areas in Australia (Dickerson, McMillen & Hallebone et al, 1997).

A number of the Australian studies provide confidence intervals for their prevalence estimates. Given the relatively small sample sizes (most 1,000 - 1,500), these intervals are moderately wide. If they were re-calculated to take account of the complex two-stage sample selection and measurement of rare characteristics they would be wider. The likely size of these effects will be considered below in relation to data from the 1991 New Zealand national survey. These wide margins of error mean that caution is required when comparing apparent differences in prevalence rates between states. Within sample comparisons and associated statistical analyses must be treated with even more caution.

There is only one Australian 'replication' survey, conducted in Tasmania in 1996, (Dickerson & Maddern, 1997). The size of the difference in six-month prevalence estimates (1.1 percent in 1994; 2.8 percent in 1996) could be statistically significant. If so it is anomalous when considered in relation to the North American replication surveys. Large differences were only apparent in North America when there was a gap of some years between studies and increases in gambling participation and expenditure in the intervening period. The Tasmanian surveys were conducted just over a year apart. In the interim, per capita expenditure appears to have remained constant or perhaps even declined slightly.

How do we interpret the Tasmanian findings? Given the likely large margins of error in both studies, they could have fallen within the expected range of chance variation. If not, there were methodological differences between the two studies that may have been at least partially responsible. For example, the initial study used door knock procedures along the lines of the 1991 four-city study. Although the initial refusal to take part in the phase one "leisure" interview was reported as 23 percent, in contrast to experience with this approach when used elsewhere in Australia, it was stated that there were no refusals to continue from part one to part two.

The 1996 Tasmanian survey used telephone interviews, although only respondents who reported weekly or more participation were included in the prevalence calculations to ensure that this aspect of the analysis was held constant across the two studies. The report authors suggested that the difference may have arisen "…from the change in method from door-knock to telephone and from the possible increased community exposure to the issues associated with the impacts of gambling" (p.63). They further asserted that the specific SOGS-R items that they considered "…to be a reliable indicator of significant gambling related problems" did not "…show an upward trend" and stated "the most secure conclusion from the 1996 data is that despite a small increase in the proportion of players at risk, the level of problem gambling in Tasmania appears to be much the same as in 1994" (p.64). This latter statement appears to be highly conjectural.

From the foregoing, it can be concluded that it would be helpful to know more about the stability of the SOGS-R and other measures of gambling-related problems when administered in different

formats including self-report, telephone interview and face-to-face interview. Until that has been done, it would be prudent to use the same format if comparisons over time are sought. It would also be helpful to validate these measures in different countries, including English speaking countries that differ culturally and have varying religious histories.

New Zealand

In 1986 a psychiatric epidemiological community survey of adults resident in Christchurch was conducted (Wells et al, 1989; 1992). The Diagnostic Interview Survey was used, including items to detect pathological gambling. It was concluded that 3.6 percent of Christchurch adults had experienced a problem with gambling at some time. Less than one half of one percent (0.4%) were diagnosed as pathological gamblers. Although the methodology used in this survey was generally sound and attained a satisfactory response rate, the estimates of pathological gambling were based on only a few questions and the time frame was not reported for two of the seven pathological gambler 'cases.' As reported earlier in this section, the DIS pathological gambling items have yet to be adequately validated.

The next study, the 1991 National Survey of Problem and Pathological Gambling, was described in some detail in Section Two (Abbott & Volberg, 1991; 1992; 1996a; Volberg & Abbott, 1994, 1997). It differed from the Australian four city study, which subsequently used many of the questions and psychometric instruments incorporated within the New Zealand survey, in that the SOGS-R was administered to all respondents who agreed to participate in the phase one telephone survey and who had ever participated in one or more of the gambling activities included in the first section of the questionnaire. In this respect the New Zealand survey was identical to the majority of the North American surveys. However, it resembled the Australian 'four-city' survey in that a number of additional measures were included in second phase face-to-face interviews.

A unique feature of the New Zealand study was the inclusion of double blind interviewer ratings of pathological gambling using DSM-III-R criteria. These ratings were assumed to represent a 'gold standard' and were used to calculate the prevalence estimates using two standard epidemiological procedures, namely the efficiency and positive predictive value methods.

From the phase one data, the current probable pathological gambling estimate was 1.2 percent (± 0.3% CI (Confidence Interval)) and the current problem estimate was 2.1 percent (± 0.4% CI). The corresponding lifetime estimates were 2.7 percent (± 0.5% CI) and 4.2 percent (± 0.6% CI).

The current probable pathological gambling estimate, re-calculated using the phase two interviewer ratings, was the same as the initial figure, 1.2 percent. Although the authors believed that they had also replicated the confidence interval pertaining to current prevalence, Manly and Gonzalez (1993) subsequently demonstrated that with rare events and two-stage samples, it is incorrect to assume that samples consistently follow a normal distribution. Through simulation, they showed that the 95 percent confidence intervals were different from what Abbott and Volberg (1992) claimed (Abbott & Volberg, 1996a). Specifically, the interval was found to be much wider. The revised current prevalence was more properly re-estimated as falling somewhere between 0.55 and 3.15 percent. The distribution was also found to be non-symmetrical.

The lifetime probable pathological re-estimates using positive predictive value analyses were limited because information on the specificity of the SOGS-R was not available. However, using specificity data from two United States samples employed in the original SOGS validation and positive predictive and sensitivity values from phase two of the New Zealand study, lifetime point prevalence estimates of 0.3 percent and 3.7 percent were obtained. These two estimates thus framed the original phase one 2.7 percent (0.5% CI) estimate.

Although the type of two-phase design used in New Zealand is widely advocated when screening instruments are used in epidemiological studies (Dohrenwend, 1995) they are relatively rarely undertaken because of the difficulty and high cost involved. The New Zealand study remains the

only such investigation in the field of pathological gambling, apart from the Swedish national study mentioned earlier. The much wider confidence intervals that resulted indicate that caution is required when screening instruments alone are used to estimate prevalence.

As discussed above, Shaffer, Hall & Vander Bilt (1997) are critical of efforts to obtain a 'gold standard' with which to validate measures of pathological gambling and refine prevalence estimates. They, and others before them, have argued that expert diagnoses or assessments based on interview and/or observational data are not necessarily more valid than the instruments they are intended to validate. In the case of the New Zealand study, although DSM-III-R criteria were used, the assessors were not clinicians and the reliability of their assessments was not determined.

Apart from these considerations concerning the validity of measurement instruments and confidence intervals in two-phase designs, reference has been made to problems that arise with the complex samples that are used in virtually all health and social science population surveys. In the case of the 1991 New Zealand survey, the published confidence intervals have been reconsidered in the light of current mathematical statistical thinking about complex sample designs. This work was undertaken by Statistics New Zealand statisticians.

The frame for the 1991 survey was all people aged 18 years and over living in private residences with a residential number listed in the New Zealand 1991 Telecom white pages. By adding 'one' to each randomly selected number, the sampling procedure allowed unlisted numbers a chance to be included. While picking up people with unlisted numbers is a desirable feature, it cannot be determined how this population was related to the New Zealand population as Telecom do not randomly allocate numbers or 'block' residential and business numbers in all directories. Thus it is not possible to determine the probabilities of selection of any units in the survey population, nor units in the sample.

Approximately 15 percent of adult Mäori and Pacific Islanders are not reached by residential telephoning. As mentioned in Section Two, the 1991 survey used a form of targeted supplementary sampling to successfully boost the numbers of Mäori and Pacific Islanders but no special method was made to weight these groups for the prevalence analyses.

One important consequence of these sample design features is that it is impossible to assign probabilities of selection to each unit. This must be done in order to calculate confidence intervals with precision and increase confidence that the results are unbiased. However, working on the assumption that the 1991 survey was a probability sample from a well designed framework using appropriate weightings, an estimate of the influence of the design effect resulting from the two-stage selection method (i.e. households selected followed by one respondent chosen per household) was calculated. These calculations also included logit adjustment to approximate for estimates of rare proportions. The resulting confidence intervals are considerably wider than those reported in Abbott & Volberg (1991; 1996a). Specifically, the current probable pathological gambling prevalence was estimated to fall between 0.77-1.87 percent. The current problem gambling estimate was 1.50-2.93 percent. The lifetime probable pathological gambling estimate was 2.01-3.62 percent. It is highly likely that even wider margins of error would apply to the other prevalence estimates reported in this review as the great majority had much smaller sample sizes.

The 1996 North Health report was also described in Section Two. Some serious methodological shortcomings were noted and it was suggested that the resulting sample was biased. In particular, Pacific Islanders and Mäori (who together accounted for almost half of the probable pathological gamblers in the 1991 survey) were under-represented and the overall response rate was low, albeit higher than many if not most of the North American and Australian surveys discussed above. The sample contained only three Pacific Island men. Consequently, weighting of the ethnic minority samples could not be used to at least partially correct for this under-representation.

The North Health current pathological gambling prevalence estimate was 0.35 percent (North Health, 1996). When the additional 540 respondents recruited by making additional callbacks and

converting some initial refusals were added to the sample, the overall current pathological gambling estimate rose slightly to 0.44 percent. Although lower than the 1991 point estimate of 1.2 percent, it is conceivable that the confidence bands of the estimates from the two surveys, if calculated to take account of the similar complex designs used in both studies, might overlap. In other words, the difference may not be statistically significant. The investigators did not report the extent to which the boosted sample corrected for the under-representation described.

Conclusion

With the exception of the 1991 Australian four cities study, there is a remarkable consistency in the findings of population prevalence studies using the SOGS, SOGS-R and related measures. In various countries and many jurisdictions within countries, SOGS-R current probable pathological prevalence estimates vary from 0.5-2.8 percent. Shaffer Hall & Vander Bilt (1997) concluded that these estimates do not vary significantly across measures or across investigators in North America. However, it does appear that the recent DSM-IV instruments generally yield somewhat lower estimates. While opinion remains divided on what, precisely, "disordered gambling" is and how it is best conceptualised and assessed, it does seem to be a robust phenomenon.

Problem and pathological gambling prevalence estimates generally appear to mirror the rankings of countries in terms of their gambling participation and expenditure, although this requires further investigation. In North America, where a large number of studies have been carried out over a longer period of time than in other regions and replications have been completed, there are indications of an increase in prevalence over time. The nature of the relationship between these changes and changes in gambling participation and expenditure require further study. It is likely that consideration of changing patterns of relationships between participation in particular forms of gambling and problem rates will be more productive than focusing on aggregate gambling expenditure figures.

To date, there have been no studies of the incidence (the number of new cases developing within a given period of time) of problem and pathological gambling. This will require prospective longitudinal studies of large cohorts. In addition to enabling the numbers of new cases that arise over given time periods to be determined, this type of research will allow risk factors for problem and pathological gambling to be identified with greater precision. This type of investigation will also enable us to discern the 'natural history' of different patterns of problematic gambling among different populations and subgroups within populations. Consideration could be given to incorporating primary or secondary prevention trials within such studies. It is essential, if the field is to advance, that investigators bring themselves up to date with current practice in psychiatric and general epidemiology and draw on the expertise of mathematical statisticians and biostatisticians familiar with the peculiarities of complex sample designs.

3.5 Risk Factors and Correlates of Problem Gambling

Introduction

The recent meta-analysis of prevalence studies in North America identified several risk factors associated with the development of gambling problems. "Being young, male, in college, having psychiatric co-morbidity, or a history of antisocial Behavior are factors that represent meaningful risks for developing gambling-related problems" (Shaffer, Hall & Vander Bilt, 1997, p.56). While other individual, social and cultural factors may play a role in the development of gambling problems, these factors certainly require careful examination in any future studies of gambling and problem gambling. The New Zealand and Australian studies point to a number of additional individual and sociocultural factors that appear to be linked to problem development. For example, being unemployed and of Pacific Island or Mäori ethnicity were additional risk factors in New Zealand (Abbott & Volberg, 1996a).

Clinical studies and experience also point to a variety of other possible factors in the development of gambling problems. However, the research evidence in support of these factors is often equivocal and varies from one jurisdiction or study to another. These factors include the availability of gambling, modes of gambling, and a family history of gambling difficulties. As just indicated, membership in disadvantaged groups in society is a further factor.

Gambling Availability and Access

Researchers and clinicians have long argued that the increased availability of gambling leads to increases in the prevalence of gambling problems. As our discussion above makes clear, the availability of all kinds of gambling has increased between 1977 and 1997. The North American meta-analysis has further established that both past year and lifetime prevalence of gambling-related difficulties have increased in this same period. However, the link between gambling availability and increases in the prevalence of gambling-related difficulties is not necessarily a straightforward one (Shaffer, Hall & Vander Bilt, 1997). As indicated in Section One, correlation does not establish causation and more sophisticated research is required to tease out these relationships and allow stronger causal inferences to be made.

The results of replication prevalence surveys completed in North America do suggest that the prevalence of gambling problems increases as a consequence of the introduction of casino-style gambling. In Minnesota and Iowa, the prevalence of gambling problems increased significantly over a four-year and six-year period, respectively (Emerson & Laundergan, 1996; Volberg, 1995). The increase in the prevalence of problem gambling in Minnesota followed a dramatic increase in the availability of legal gambling around the state, including a lottery, pulltabs, high-stakes bingo, and full-scale casinos run by nearly 20 American Indian tribes. The increase in the prevalence of problem gambling in Iowa followed the introduction of riverboat casinos, Native American casinos and slot machines at racetracks. However, a significant increase in the lifetime prevalence of problem and probable pathological gambling in New York between 1986 and 1996 appeared to be related to increases in the availability of legal gambling regionally rather than to specific introductions within the state (Volberg, 1996a).

The recent National Opinion Research Center (NORC) survey examined casino proximity in relation to problem and probable pathological gambling prevalence. It was found that the location of a casino within 50 miles (versus 50 to 250 miles) is associated with about double the prevalence (National Opinion Research Center, 1999b). Lower prevalence rates found for country areas in some of the Australian state surveys could also, at least in part, reflect gambling availability differences.

The question of whether gambling availability causes increases in the prevalence of gambling difficulties is one that requires longitudinal, time series and quasi-experimental research to answer. As indicated, to date there has been almost no longitudinal research conducted with problem gamblers. The longitudinal component of the present New Zealand study should contribute to our understanding of the relationship between the availability of gambling and changes in the prevalence of gambling-related problems over time.

Clinical presentation data have some relevance to this issue but need to be treated with caution. For example, time-series data from the New Zealand national gambling hotline indicated that there was a sharp rise in presentations from people reporting problems with casino gambling following the opening of a new casino (Sullivan et al, 1997). However, from the data presented, there is no way of knowing whether the increase in calls from people seeking help was due to new problems arising from participation in casino gambling, a consequence of increased public awareness and advertising of the hotline number in the casino, or due to other factors.

Gambling Mode

Since the early 1980s, clinical observation and retrospective studies of pathological gamblers in treatment or attending self-help groups have pointed to the different ‘careers’ experienced by individuals with gambling problems. Early research on problem gambling suggested that individuals

with gambling difficulties were most likely to prefer wagering on horse races and that their difficulties took many years to develop (Volberg & Steadman, 1988a). As indicated in Section Two, forms of gambling with an element of skill have also been shown to be associated with problem gambling. More recent investigation suggests that a growing proportion of individuals with gambling difficulties prefer to bet on gaming machines and that their difficulties develop far more quickly than in the past (Abbott & Volberg, 1992; Sullivan, Abbott & McAvoy, 1994). The media and some clinicians have even labelled gaming machines the "crack cocaine" of gambling (Bulkeley, 1992).

In the Australian and New Zealand surveys, respondent preferences for gaming machines, track betting and casino gambling (which also includes machines) are consistently associated with SOGS-R defined problem and probable pathological gambling. These findings parallel those from problem gambling treatment services in both countries (Abbott et al, 1994a; 1994b; Dickerson, McMillen, Hallebone et al, 1997; Compulsive Gambling Society of New Zealand, 1997; 1998) and the recent Swedish national prevalence study (Rönnberg et al, 1999).

The question of the impact of gaming machines on the evolution of gambling difficulties is especially salient because of the growing reliance of the gaming industries on these devices. In mature gambling markets, as we noted above, 70 percent to 80 percent of industry revenues come from gaming machines. Electronic gaming machines represent the fastest growing segment of gambling markets internationally. Depending on the jurisdiction, these machines can be located in casinos, social clubs, bars, restaurants, taverns, amusement arcades and convenience stores. Gaming machines are appealing to young people familiar with video games played on computers at home and school and to women who may be uncomfortable with more traditional casino table games and track betting and prefer clubs and casinos which may be perceived as safe environments.

In jurisdictions where electronic gaming machines are widespread, such as Montana, Oregon and South Dakota, prevalence studies show that problem gamblers are just as likely to be women as men (Polzin et al, 1998; Volberg, 1997b; Volberg & Stuefen, 1994). This is not the case in any of the Australian and New Zealand prevalence surveys where quite strong gender differences are apparent. However, a different picture emerges from recent statewide problem gambling treatment services in parts of Australia. In Queensland, Victoria and South Australia, where gaming machines are now widely distributed in clubs, hotels and casinos, male and female presentation rates are similar (Dickerson, McMillen, Hallebone et al, 1997). In New Zealand, although a male differential persists, the percentages of women calling the national problem gambling hotline and presenting for treatment have increased in recent years. They typically report problems with gaming machines. In 1997, one in four women seeking help from the hotline reported problems associated with casino gambling (Compulsive Gambling Society of New Zealand, 1998).

Clinical presentation data reflect complex mixes of actual problem levels within the community, service visibility, accessibility and acceptability and help-seeking behaviours. Women may be more willing to seek help for gambling problems at an earlier stage than men. Changes in presentation numbers or patterns do not necessarily mirror overall or differential changes in incidence or prevalence rates. It will be interesting to see whether future prevalence surveys find the male-female current prevalence difference to have reduced. Again, longitudinal research is needed to identify more precisely the development of gambling difficulties associated with gaming machines in different sectors of the population, and the risk factors that may accompany this evolution, such as linking the availability of gaming machines with the serving of alcohol. It will be important to examine possible gender differences in this regard. To date, they have been little investigated.

Gambling Involvement

Two findings are consistent across almost every survey of gambling and problem gambling in the general population. Problem gamblers in every jurisdiction and from every population segment (adult, adolescent, tertiary education, etc.) are significantly more likely than non-problem gamblers to gamble once a week or more often (Volberg, 1996a). In every jurisdiction and in every population

segment, problem gamblers report spending significantly more on gambling activities than non-problem gamblers. Those groups within populations that have higher problem gambling prevalence rates - e.g. men in most jurisdictions, teenagers and young adults, unemployed and low income people - also generally have higher levels of gambling involvement than low prevalence groups. **In New Zealand, this also holds for** Mäori and Pacific Islanders (Abbott & Volberg, 1991; Volberg & Abbott, 1997).

Sociodemographics

Although prevalence rates vary across jurisdictions, problem gamblers in the general population are strikingly similar despite differences in the availability of different types of gambling. As indicated, problem and pathological gamblers in the general population are significantly more likely than non-problem gamblers to be male, under the age of 30, non-Caucasian and unmarried. Problem gamblers in the general population are significantly less likely than non-problem gamblers to have completed secondary education (high school in North America). Problem gamblers in the general population recall starting to gamble at a significantly younger age than non-problem gamblers (Abbott & Volberg, 1996a). Similar demographic patterns among problem gamblers have been identified consistently across jurisdictions internationally (Abbott & Volberg, 1996a; Becoña, 1996; Dickerson, Baron, Hong & Cottrell, 1996; 1997; Ladouceur, 1996; Rönnberg et al, 1999; Volberg, 1996a).

One interesting change that has occurred in recent years is an apparent increase in the proportion of problem gamblers who are relatively well-off financially. In the earliest surveys of problem gambling, the annual household income of problem gamblers was significantly lower than the annual household income of non-problem gamblers (Volberg, 1994). In a number of more recent surveys of problem gambling, the annual household income of problem gamblers is not significantly different from the annual household income of non-problem gamblers (Volberg, 1996a). One explanation is that these more recent surveys have been carried out in jurisdictions with generally lower income levels. Another possibility is that more middle-class individuals are gambling and getting into difficulties with these activities, as predicted by Rosecrance (1988).

Older adults have lower current and lifetime prevalence rates than those in the young and middle age categories, suggesting lower rates throughout their lives rather than a 'maturing out' of earlier problems. However, it is possible that recent higher levels of gambling involvement by older people in some surveys may soon be reflected in a rise in problem gambling rates. This hypothesis should be considered in future surveys. Rising prevalence rates among women, apparently associated with gaming machine involvement, was noted previously. This also requires further study.

Younger people (mid to late teens and young adults) in most jurisdictions have higher current and lifetime problem prevalence rates than other age groups. However, they are usually under-represented in treatment settings. The finding of higher lifetime as well as current rates among younger people is consistent with the hypothesis that prevalence rates have risen in recent years. Whether problem and pathological gambling in young people tends to follow a progressive course or whether many of them are involved in a short-term pattern of behaviour that they pass through are questions that have yet to be adequately addressed.

Abbott & Volberg (1992) found that their phase two pathological gamblers and regular non-problem gamblers reported making substantial reductions in their gambling expenditure following the arrival of children. What this change meant in terms of respondent problem gambling behaviour at that time is unclear. Some other major life events also appear to have had an impact on gambling participation. These findings, however, were based on retrospective accounts of events that in some cases took place many years before. Some of the methodological shortcomings of this aspect of the 1991 study were discussed in Section Two. This is another area where longitudinal investigation should be helpful.

One implication of these various risk factors is that some of them could have a substantial impact on prevalence rates, including differences across studies or over time in replication studies. This could confuse interpretation of observed differences or lack of differences. Similarly, they could confound comparisons between groups within particular studies. The use of standardised prevalence rates, to hold constant some key factors such as age, ethnicity and unemployment, would assist. The use of odds ratios from multiple logistic regression, or explained variances from multiple linear regression when continuous measures of gambling problems are used as the dependent variable, would also assist in making sense of relationships between highly inter-correlated risk factors and problem and pathological gambling.

Children of Pathological Gamblers

One of the risk factors for problem and probable pathological gambling in a number of the prevalence studies referred to above was respondents' reports that a parent or parents experienced a gambling problem. Further work is necessary to clarify what processes underlie this relationship if, indeed, there is an actual rather than perceived link. Social learning and/or genetic factors could be involved. To date, relatively little investigation of the type that is now well established with respect to alcohol dependence and some other forms of major mental disorder has taken place with respect to the children of problem gamblers. However, there are reports of elevated rates of child abuse (Bland et al, 1993), and experience of major traumatic life events including parental separation, divorce and death of a parent among children of pathological gamblers (Jacobs, 1989).

Indigenous People

Prevalence surveys among several disadvantaged groups have been completed since 1992. These surveys have identified substantially higher rates of lifetime and current problem and probable pathological gambling among these groups than in the general population. Disadvantaged groups with high prevalence rates of problem and probable pathological gambling include New Zealand Mäori and Native Americans in Montana and North Dakota (Polzin, et al, 1998; Volberg & Abbott, 1997). High rates of problem and probable pathological gambling were also identified in a recent survey in the general population in Puerto Rico (Volberg & Vales, 1998).

The New Zealand 1991 national survey included a random sample of 3,933 respondents as well as an additional 120 Mäori and Pacific Island respondents. The survey in North Dakota included a random sample of 1,517 respondents and an additional sample of 400 Native Americans (primarily Sioux and Chippewa) from the four counties in the state with the highest proportion of Native American residents. The survey in Montana included a random sample of 1,227 respondents and an additional sample of 108 Native Americans selected from residents of the Flathead Reservation. The survey in Puerto Rico included a random sample of 1,506 respondents.

All of the New Zealand and Montana respondents and the majority of the North Dakota respondents were interviewed by telephone. A small group of the Native American respondents in North Dakota were interviewed in person by Native American interviewers. All of the Puerto Rico respondents were interviewed in person by Puerto Rican interviewers. The questionnaire used in all of these studies was composed of three sections. The first section included questions about gambling involvement. The second section included the lifetime and current SOGS-R. The final section included sociodemographic items.

Despite great differences among indigenous peoples throughout the world, there are similarities in the conditions under which many of these groups live. Poverty, unemployment and dependence on welfare are widespread. Many such groups have been subject to a history of colonisation and accompanying policies of economic exploitation. Typically, they remain disadvantaged in socioeconomic terms. Like other indigenous groups, Mäori, Native Americans and Puerto Ricans have relatively low levels of formal education and household income. These groups also have high unemployment rates and high levels of morbidity and mortality on a wide range of indices including particularly high rates of alcohol and substance misuse.

Table Six shows the past year prevalence of problem and probable pathological gambling for the New Zealand Mäori, North Dakota Native Americans, Puerto Rican, and Montana Native American samples. The table shows the past year prevalence among Native Americans in the Montana household sample separately from the Native Americans on the Flathead Reservation. The Flathead Reservation is comparatively well-to-do and residents on this reservation are better off, socioeconomically, than Native Americans living off-reservation or on other reservations in Montana.

Past year prevalence rates are far higher among these groups than among general population samples. In another context, it has been suggested that, in contrast to the upper and middle classes, the working and lower classes represent subcultures where gambling is a socially sanctioned activity that gives status to the participants (Volberg, Reitzes & Boles, 1997). It may also be perceived as a means to make money and change their lives (Abbott, 1997b). Combined with the stresses that are part of working class and lower class life, gambling represents a challenging opportunity to beat the system, get some action, demonstrate one's skills, and gain prestige among one's friends. Since gambling is so widely sanctioned and gambling participation and expenditures are generally much higher among these groups, it follows that prevalence rates of problem and probable pathological gambling may also be higher than in jurisdictions where these groups represent a far smaller proportion of the population. We can hypothesise that the extremely high prevalence rates among Native Americans in Montana and North Dakota, Mäori in New Zealand and in Puerto Rico all emerge, at least in part, from the role played by gambling in these marginalised cultures.

Table Six: Current Problem and Probable Pathological Gambling Prevalence Rates Among Disadvantaged Groups

Year	Sample	Current Problem %	Current Prob/Path %	Current Total %
1991	NZ Maori	4.6	2.2	6.8
1992	North Dakota Native Americans	5.8	6.5	12.3
1997	Puerto Rico	4.4	6.8	11.2
1998	Montana Native Americans (res)	6.5	2.8	9.3
1998	Montana Native Americans (hh)	3.8	7.6	11.4

We understand that community surveys of problem gambling have been conducted among Australian Aboriginal groups, that the prevalence rates were very high and that the results have not been published. Without access to these reports, it is not possible to comment on the likely validity or otherwise of these studies. The numbers of Aboriginal respondents included in the state-level surveys were too small to analyse separately.

Ethnic Minorities, Migrants and Refugees

Little prevalence research was located on ethnic minorities within ethnically diverse societies. The sample sizes of most prevalence surveys preclude meaningful analysis by ethnic subgroupings. A partial exception was the 1991 New Zealand national survey. The Pacific Island respondents, especially Pacific Island men, had very high rates of SOGS-R defined problem and probable pathological gambling, higher than those reported to date in other population prevalence studies. However, this sample was also relatively small and the estimates had wide margins of error. Pacific Island New Zealanders, both recent migrants and those of second or subsequent generations, are on average younger than the general population and more likely to be unemployed. In this situation it is difficult to know how much their higher risk for problem gambling is a function of ethnicity and culture rather than these associated risk factors.

Anecdotal accounts of high levels of gambling problems among certain recent migrant and refugee

communities have come from a number of countries. In some instances these groups are marginalised, disadvantaged and share many characteristics of other high risk groups. Others, for example recent Chinese migrants to North America, Australia and New Zealand, tend to be relatively well off financially, although they experience high levels of unemployment and underemployment (Abbott et al, 1999). It remains to be determined whether these accounts and perhaps stereotypes have substance when examined empirically. With respect to other forms of mental disorder, the relationship between morbidity and migrant or refugee status is complex (Abbott, 1997a). Neither status can be regarded as unitary and while there are often subgroups within particular migrant or refugee populations that are at very high risk, overall, prevalence rates may be similar to or even lower than that of the general population.

The 1998-1999 Swedish national survey includes a boosted sample of approximately 500 first generation migrants and refugees. From preliminary analysis it appears that this somewhat diverse group does have an elevated prevalence of probable pathological gambling relative to the general Swedish adult population. (Rönnberg et al, 1999).

Co-morbidity

A moderate amount of research has been undertaken on mental disorders and other symptoms that can accompany pathological and problem gambling. Most of this research has been conducted with people in treatment settings and has been referred to earlier in the review. However, some attention was also given to this matter in the second phase of the 1991 Australian and New Zealand surveys and some of the subsequent state-level Australian surveys. This is one of the advantages of the two phase approach involving face-to-face interviews in one (as in New Zealand) or both (as in Australia) phases; i.e. it enables more information to be gathered than is feasible in telephone interviews.

It is worth noting that the recent national survey in the United States included screens for manic and depressive episodes as well as for alcohol and drug dependence along with the NODS, the new problem gambling screen based on DSM-IV criteria (National Opinion Research Center, 1999b). This study found that problem and pathological gamblers were significantly more likely than other respondents to have experienced symptoms associated with manic disorders, to have ever experienced a major depressive episode, to have ever been alcohol- or drug-dependent and to have used illicit drugs in the past 12 months.

In both Australia and New Zealand, strong associations were found between probable pathological gambling and hazardous use of alcohol. Weaker associations were found with General Health Questionnaire scores, which measure minor mental disorder. The New Zealand survey also found a link with depressive symptoms. As is often found with cases of disorder or illness identified by community surveys, the levels of distress or disturbance on these symptom measures were lower than what is typical of pathological gamblers in treatment settings (Abbott & Volberg, 1992). As discussed previously, more research is required to clarify diagnostic and other issues related to co-morbidity. Shaffer, Hall & Vander Bilt (1997) provide a useful discussion of this topic.

Recent studies of the effects of alcohol consumption on the gambling behaviour of regular ‘continuous’ gamblers underline the importance of examining alcohol intake patterns as predictor or risk factors for problem gambling in epidemiological studies. These studies (Baron & Dickerson, 1998; Kyndon & Dickerson, 1998) found a link between acute alcohol intake and both increased duration of gambling and impaired control of gambling behaviour.

3.6 Prison and Residential Treatment Populations

Introduction

The present review is primarily concerned with providing a critical examination of research concerning gambling and problem gambling in the general population. The studies summarised and discussed to this point have mainly been community surveys that did not include 'institutionalised' populations. Groups in this category include, among others, people in boarding school or college/university hostels, people living in military barracks or in hospital, therapeutic or custodial settings, and older people resident in rest homes or other forms of supported accommodation. Significantly, in the present context, pathological gamblers in residential treatment programmes are part of this excluded category. Additionally, people who are homeless or living in various forms of sheltered accommodation are omitted.

While the percentage of the total population living in such situations is relatively small, it varies across jurisdictions and over time. The United States, for example, has very high rates of incarceration. There is good reason to believe that some if not most of these groups have distinctive patterns of gambling and high rates of problem gambling (Shaffer, Hall & Vander Bilt, 1997; Walker & Dickerson, 1996). This has led Lesieur (1994) and others to argue that the omission of these groups from community prevalence studies could be expected to result in significant under-estimation of the prevalence of disordered gambling.

Apart from the impact that the exclusion of these special populations may have on overall prevalence estimates, they are of interest in their own right. They also offer some unique opportunities to study particular aspects of gambling behaviour and problem gambling.

As mentioned from the outset, the reason for the selective focus of this review is that it is intended to inform the design of the New Zealand Gaming Survey (NZGS). The NZGS also includes a survey of prisons. For this reason, considerably more attention is given to the relevant prison and related literature than to other specialist populations.

The decision to include a prison survey in the NZGS stems in part from an interest in gambling and gambling problems within this segment of the population. Prison populations also typically include disproportionate numbers of people from groups that are known or suspected to be at particularly high risk for the development of gambling problems. These high-risk categories include people who are young, unemployed, of low educational and socioeconomic status and who come from marginalised groups within society including indigenous people. Prison populations also include significant numbers of people with personality disorders, substance misuse and dependence disorders and a variety of other forms of mental disorder that display moderate to high levels of co-morbidity with pathological gambling. Apart from obtaining prevalence data on New Zealand prisons, it was also intended that relationships between some of these variables and problem and pathological gambling will be investigated. In addition, we have an interest in hypothesised links between pathological gambling and criminal offending (Blaszczynski & Silove, 1996).

Shaffer, Hall and Vander Bilt (1997) located 18 North American prevalence studies that had been conducted in prison, substance dependence and psychiatric in-patient settings. With respect to problem and probable pathological gambling prevalence rates, no significant differences were found between these studies. Consequently, they were grouped together for subsequent analysis. The lifetime probable pathological prevalence gambling estimate was 14.2 percent (10.7-17.8% CI). The lifetime problem prevalence estimate was 15.0 (8.9-22% CI). Current prevalence estimates were not available. These lifetime rates are very high relative to those reported for general population surveys earlier in this section.

Prison Prevalence Studies

Our literature search found only two peer reviewed accounts of prison prevalence surveys (Templer, Kaiser, and Siscoe, 1993; Walters, 1997). Both were included in the Shaffer, Hall and Vander Bilt (1997) meta-analysis.

Templer, Kaiser, and Siscoe (1993) used the SOGS to assess 136 consecutive admissions to a medium security prison in Nevada. This study found a 26 percent lifetime prevalence of probable pathological gambling. The high prevalence rate could have resulted in part from an atypical prison population, in that the location of the prison surveyed was 30 miles from the gambling centre of Las Vegas. Walters (1997) administered the SOGS to 363 male medium security inmates in Pennsylvania. The lifetime probable pathological gambling prevalence in this sample was 5.2 percent. The lifetime problem gambling prevalence was 7.4 percent.

Two further relevant studies were located. Neither had been published in peer reviewed proceedings or journals. At the Canning Vale Remand Centre in Western Australia, Jones (1990) administered the SOGS to a small (n = 62) random sample that was apparently representative of the 124 remandees in the service. The lifetime probable pathological prevalence was 22 percent. A similar result was obtained in Auckland, New Zealand, with a sample of 100 convicted offenders on community sentences (Brown, 1998). Participants were obtained by approaching offenders who reported to Community Corrections Centres and attended periodic detention work programmes. Just over a quarter (26%) of this sample was identified as lifetime probable pathological gamblers. The lifetime prevalence rate for SOGS defined probable pathological gambling in the New Zealand adult general population was estimated to be 2.7 (+/- 0.5) percent in 1991 (Abbott and Volberg, 1996a). At any given time, approximately 25,000 New Zealanders are serving this type of non-custodial sentence. Unlike remandees and sentenced prisoners in custody, people in this category could be included in general population surveys.

These findings suggest that pathological gambling prevalence rates are high among remandees and convicted offenders in community corrections and prison settings. Further surveys are required to obtain a more precise estimate of the prevalence of pathological gambling in these categories of offender as well as those in minimum and maximum security facilities. It would also be helpful to obtain current prevalence estimates for both probable pathological gambling and less severe forms of problem gambling. Women were not included in any of the studies and it would appear that there is nothing in the literature concerning female offender problem gambling.

The Relationship between Gambling and Offending: Pathological Gambling Studies

The high prevalence rates of pathological gambling in prison and community corrections populations highlight the need to consider the relationship between pathological gambling and criminal offending. Various writers have presented a typical or common profile of pathological gambler offenders and have proposed that there is a causal relationship between gambling and offending. Pathological gamblers are seen as being at high risk for committing criminal offences. These offences are generally gambling-related and occur late in the development of gambling problems in response to the need to maintain habitual gambling behaviour, or out of desperation to settle gambling debts. The nature of the offending involves non-violent property crimes and this offending is claimed to cease when excessive gambling behaviour is in remission (Lesieur, 1987; Rosenthal & Lorenz, 1992; Blaszczynski & Silove, 1996).

The construction of this profile has been derived from studies of pathological gamblers seeking treatment or attending self-help support groups (Brown, 1987; Lesieur & Puig, 1987; Meyer & Fabian, 1992; Blaszczynski & McConaghy, 1994b).

Brown (1987) undertook a postal survey of 107 males attending GA groups in the United Kingdom. In comparison with general population conviction patterns, pathological gamblers were found to

be much more likely to commit non-violent property crimes including theft, fraud, and embezzlement. Brown suggested that problem gambling contributed to these types of crime. However, causation cannot be asserted with any confidence from retrospective studies of this type. In addition, sociodemographic information was not collected to help address the issue of confounding variables. As is typical of postal surveys, the response rate was very low (35%), indicating a potential for sample bias.

A far more substantial study of 437 mostly male members of GA was conducted in West Germany by Meyer and Fabian (1992). These investigators found that 54.5 percent reported having committed "delinquent behaviour" (i.e. they had obtained money for gambling through illegal means). They compared GA members in this category with those who did not report this type of criminal activity. The former respondents were significantly more likely to be involved in 'excessive' gambling as measured by their frequency of gambling and extent of gambling losses. In addition, they had significantly higher DSM III-R pathological gambling ratings. Based on multiple regression analyses of their data, Meyer and Fabian (1992) proposed a causal model which specified relationships between pathological gambling and the development of "delinquent behaviour".

Blaszczynski and McConaghy (1994b) surveyed 152 consecutive DSM III diagnosed pathological gamblers undertaking hospital treatment and 154 pathological gamblers attending GA groups in Sydney, Australia. In their samples, which included 35 women, high rates of offending were evident with 59 percent admitting to gambling related offences and 17.6 percent to non-gambling related offences. The most common offences were gambling-related non-violent property crimes, associated with amounts of money on average three times higher than non-gambling related crimes. They argued that the association between pathological gambling and offending was causal with the former leading to the latter. Their argument largely hinged around the finding of age differences between the commencement of the two patterns of behaviour. The mean age at which gambling behaviour began was 18.7 years (SD = 7.85). There was, on average, a gap of nine years to the onset of gambling-related offending. The majority of the offending was not detected with only 40.3 percent being charged. The most common dispositions for those convicted were good behaviour bonds, fines, and custodial sentences. In Section One, it was explained that while a necessary condition for inferring causation is that the proposed cause precedes the effect, this is not sufficient to establish that a relationship is causal.

The association of pathological gambling with non-violent property crime was highlighted in another GA study, in this instance involving a sample of 241 members from the United States East Coast (Lesieur and Puig, 1987). This study focused on insurance related crime. Of the sample, 47 percent acknowledged committing some form of insurance related fraud that was connected to their pattern of gambling. It was suggested that insurance fraud among pathological gamblers is pervasive because it is 'victimless' and reflects a social belief that insurance companies are a legitimate target for fraudulent activity. Although this suggests a very high rate of insurance-related crime among pathological gamblers, without examination of this form of offending in a comparison group from the general population, this cannot be asserted with confidence.

The Relationship between Offending and Gambling: Corrections Studies

Offenders in prison or on community sentences, whose offending pattern is known but whose gambling behaviour is not known, provide a comparison group to help validate the profile determined by research involving known pathological gamblers. However, there is a paucity of research with known offenders. Those studies that do exist differ in research design, suffer from inadequate sample sizes, or vary in the aspects of offending and gambling that they focus on. These factors make the comparison between studies difficult.

As indicated earlier, Walters (1997) interviewed 363 inmates from a medium security federal prison in the North East of the United States. The interview focused on pre-incarceration gambling behaviour rather than on patterns of offending. Information on each inmate's history of imprisonment

was obtained but no statistically significant relationship was found between type of offending and SOGS scores.

Templer, Moten and Kaiser (1994) considered a distinct sub population within a prison. This study examined the characteristics of men who had been convicted and imprisoned for casino gambling offences in Nevada (n = 28). The majority of these respondents had been found guilty of cheating using poker machines. The demographic characteristics and information gleaned from detailed pre-sentence reports was compared with similar information from other inmates in the prison. This subgroup was a white, older inmate population with no history of violent offending, but a history of social, marital, financial and vocational instability. They were described as "drifters" and "habitual criminals" with a lifestyle entrenched in non-violent crime. Gambling behaviour was not examined in any detail.

Jones (1990) used a 30-item questionnaire to investigate the relationship between gambling and offending with remandees in Western Australia. SOGS-identified probable pathological gamblers (n = 13) were compared with the rest of the sample (n = 49). Probable pathological gamblers tended to be involved more than weekly in both casino gambling and betting on horses (patterns associated with the rapid development of debt). Among the probable pathological gamblers, eight were classified as gambling-related offenders based on their gambling behaviour in the 12 months prior to imprisonment. In contradiction to the offending profile outlined earlier, six had been convicted of offending by age 17. This challenges the view that offending occurs late in the development of pathological gambling and is a response to it. However, these findings are based on a very small sample.

Studies of prison populations preclude consideration of offending that is not severe enough to warrant a prison sentence. In Brown's (1998) survey of 100 offenders on community sentences referred to earlier, over a third of the probable pathological gamblers mentioned some connection between their problem gambling and offending pattern and a slightly smaller number stated that their last offence was gambling-related. Approximately a fifth said that gambling caused them to offend. The small sample size involved in this pilot study and nature of the design again preclude the possibility of a more informative examination of proposed causal linkages between pathological gambling and offending. The type of offending that these people were involved in was not discussed.

This small group of studies provides mixed support for the commonly held criminal profile of the pathological gambler. However, there are further studies that indirectly challenge aspects of this profile.

The assumption of a causal relationship between gambling and offending, with offending occurring late in the development of problem gambling, is challenged by studies that consider patterns of gambling in young offenders. Maden, Swinton, and Gunn (1992) surveyed a random sample of 404 incarcerated young offenders in eight youth custody centres in the United Kingdom. The mean age of participants was 19 years. Twelve percent (n = 48) were classified as 'excessive gamblers' based on the frequency of gambling behaviour prior to arrest. Just over two percent (n = 9) met DSM-III-R criteria for pathological gambling. In comparison with the rest of the sample, 'excessive gamblers' were significantly more likely to have been sentenced for theft; to have an offending history involving several convictions starting before age 15; to have been in institutional care; and to have experienced psychiatric treatment. The researchers proposed that gambling and offending are both "markers" of pre-existing childhood patterns of behaviour, rather than being causally related.

Yeoman and Griffiths (1996) also examined the early development of both offending (mostly theft) and adolescent gambling in the form of gaming machine participation. Over one year, police in the South West of England gathered data from 1,851 juvenile offenders. Of the sample, 3.9 percent of cases indicated an association between offending and machine playing. Of these 72 cases, the majority were males ranging in age from eight-16 years. Most of the offences (86%) involved theft

or burglary. This study did not determine if people stole to play the machines, or stole and then subsequently played the machines as a way of obtaining enjoyment from the money gained. It did not determine whether the adolescent offending was gambling related, co-existed independent of gambling, or was peer driven.

Abbott, Palmisano and Dickerson (1995) challenged the proposal of a causal link between gambling and adolescent patterns of delinquency. Their study of 183 video game players between the ages of 11 and 16 in Sydney, concluded that variables other than gambling (such as the lack of parental involvement in amusement arcade environments) may more effectively predict delinquency than patterns of gambling.

The literature also suggests that other types of crime, apart from non-violent property crime, could be associated with gambling. These include armed robbery (Jones, 1990); a past history of incarceration including violent offences (Levey, 1984); violent action in retaliation for failure to meet debt payment (Lesieur, 1987); pimping and prostitution (Blaszczynski and Silove, 1996); gambling as a means of laundering money for organised syndicates of criminals (Department of Internal Affairs, 1996); domestic violence related to gambling induced pressure on families (Department of Internal Affairs, 1996); and offending related to cheating in gambling (Lesieur, 1987). In the absence of well designed research to address the relationship between these types of criminal activity and problem gambling, the extent of such relationships remains uncertain.

Corroboration of the hypothesised common criminal profile of pathological gamblers requires the systematic examination of potential confounding variables. To date, little attention has been directed toward the identification of other factors that are associated with criminal behaviour in problem gamblers or problem gambling among criminal offenders. As already mentioned, studies in the latter category have been confined to men. Given the much higher prevalence of serious gambling problems among males in most community surveys, comparison of male prison samples with mixed gender samples from the general population will yield inflated differences.

Some further potentially confounding sociodemographic variables were mentioned earlier. In New Zealand, Mäori and Pacific Islanders, young males, people with lower education levels and who are unemployed, are at high risk for both the development of disordered gambling and criminal offending and incarceration Abbott & Volberg, 1996a; Brown, 1998). These types of common antecedent could account for some or most of the apparent relationships between problem gambling and offending.

Most attention concerning confounding variables has focused on the issue of co-morbidity. Shaffer, Hall and Vander Bilt (1997) drew attention to the high rates of disordered gambling among those with concurrent psychiatric disorders. Templer, Kaiser, and Siscoe (1993) compared SOGS scores with results from the routine application of the Minnesota Multiphasic Personality Inventory to prison inmates in Nevada. This study found a positive correlation between probable pathological gambling and depression, attempted suicide, high anxiety, and alcohol and substance abuse. Walters (1997) and Brown (1998) also found significant, positive correlations between probable pathological gambling and alcohol and drug misuse.

The DSM IV excludes a diagnosis of pathological gambling if gambling behaviour is better explained by a manic episode. Very few studies of pathological gambling, in any setting, have screened for current Bipolar Affective Disorder. McCormick, Russo, Ramirez and Taber (1984) applied the Schedule of Affective Disorders and Schizophrenia (SADS) to 50 consecutive admissions to an inpatient gambling treatment programme in Cleveland. Of this sample, 38 percent had a lifetime occurrence of hypomanic disorder. The extent to which a manic episode occurred concurrently with episodes of pathological gambling was not indicated.

Kennedy and Grubin (1990) considered the issue of problem gambling as part of a generalised "impulsive personality." This study considered a sample of 51 male inmates, the majority of whom were sex offenders, a prison sub-set chosen because of its association with poor impulse control.

Each individual was rated by psychometric measures on six behaviours thought to be impulsive. These were alcohol abuse, sedative dependence, other drug abuse, pathological gambling (DSM III-R criteria), repeated aggression and self-harm. Each individual was also measured on the Impulsive Scale (IS). Pathological gambling did not correlate with any other behaviour, which is seen as being consistent with the hypothesis that pathological gambling is not a component of a generalised "multi-impulsive personality disorder."

The focus in considering co-morbidity has centred on the significance of a diagnosis of antisocial personality disorder (ASPD). This is particularly important in the present context given its very strong relationship with criminal offending and high prevalence in prison populations. Demonstration of a link between ASPD and pathological gambling would challenge the assumption that offending behaviour evolves as a result of habitual gambling. Rather, it would suggest that pathological gambling is a manifestation of the risk behaviour associated with ASPD, and that pathological gamblers are actually criminals first and gamblers second (Shaffer, Hall & Vander Bilt, 1997).

Blaszczynski and McConaghy (1994a) considered the diagnosis of ASPD (DSM III) with respect to 306 pathological gamblers (271 male and 35 female), either seeking treatment or attending GA in Sydney, Australia. Of the total sample, 65 percent reported offending which was either gambling related, non-gambling related or incorporated both. Of the total sample, 15 percent (n = 47) met a diagnosis for ASPD (DSM III). All of these were male. Of the 47, 39 reported involvement in offending. For this group it was concluded that their gambling is another expression of their ASPD. However most of the offending committed by the pathological gamblers was done by those not diagnosed as ASPD, and this study concluded that offending emerges in pathological gamblers in response to gambling related-difficulties rather than as a manifestation of antisocial behaviour.

Antisocial personality traits exist in some individuals yet fall short of satisfying the formal criteria for ASPD. Whether such traits are unrelated to gambling, lead to gambling, occur in response to gambling or are an expression of a generalised 'impulsivity' remains to be determined.

Evidence for multi-factorial links between pathological gambling and offending are further highlighted in yet to be published research by Meyer and Stadler (1998). This study used a comprehensive questionnaire, which examined personality, social attachment, pathological gambling and criminal behaviour among 300 male pathological gamblers in treatment, and 274 "frequent and occasional" male gamblers in the general population, in Germany. From this sample comparisons were made between gamblers with high and low intensity of criminal involvement. As with the findings of Blaszczynski and McConaghy (1994a), there was an identifiable group for whom it was concluded that pathological gambling was an expression of their antisocial personality (estimated to be approximately 20% of the pathological gamblers). However despite this sub-group, Meyer and Stadler (1998) state that pathological gambling behaviour remains as an important factor in precipitating criminal activities, especially property crimes.

It will require prospective longitudinal studies of large population cohorts followed from childhood to adequately disentangle the various connections between gambling behaviour, problem gambling and offending. It seems likely from the research to date that in many instances problem gambling leads to criminal behaviour in people who would not otherwise commit crimes. However, for others, criminal behaviour precedes or occurs independently of their gambling problems and may be part of an antisocial personality disorder or subclinical antisocial personality pattern. Some people will probably fall into both of these categories. There is also the possibility that pathological gambling may give rise to behaviour patterns in adulthood that resemble antisocial personality. If so, careful history taking will help to differentiate this group from those with antisocial personality disorders that, by definition, date from childhood. Again, however, longitudinal studies will be necessary to provide more definitive developmental histories. While the foregoing will be expected to account for much of the over-representation of problem and pathological gamblers in criminal justice settings, in some situations they may be secondary to other determinants such as gender, age, unemployment and ethnicity.

Other Reasons for Studying Gambling in Prison Populations

As well as having the potential to provide some information relevant to the issues just outlined and summarised, studies of prison populations have significance in their own right. For example, prison environments per se may constitute a significant risk factor for the development of gambling-related disorders. Gambling possibly has the potential to relieve some of the discomfort of the prison environment. In prison, gambling may be part of the pervading sub-culture. It is possible that social pressure exists for inmates to be involved, but there may be a lack of social controls to help inmates moderate their behaviour.

Jones (1990) indicated that in the remand prison he studied, all gambling-related offenders (n = 8) gambled in prison. Card games were the most popular form of gambling activity. Of these offenders, four reported winnings in excess of prison wages, which indicated the potential for difficulties in settling debts. Bellringer (1986), in a survey questionnaire administered to 12 inmates who were part of a GA group in Ford Prison, Sussex, England, also indicated that gambling behaviour was part of the prison subculture. Betting on horses, cards and snooker were the gambling activities of choice, and the currency used to engage in them included cash, tobacco, sweets and cannabis. In both cases, gambling in prison was prohibited. However, it would seem that the prison authorities did not enforce these prohibitions.

In our view, the high prevalence of pathological gambling in prison indicates the need to consider treatment options during imprisonment. Pathological gambling is typically episodic with individual gambling involvement and related problems fluctuating over time (Shaffer, Hall & Vander Bilt, 1997). Walters (1997) found a correlation between reports of less severe and less extensive patterns of gambling and spontaneous remission of problem gambling in his inmate sample during the 12 months prior to incarceration. However, this type of remission was less common for those with more severe gambling problems.

Although pathological gamblers in prison generally appear to have a poor history of accessing treatment options and self help groups, many express a willingness to do so if services are available (Jones, 1990; Walters, 1997; Brown, 1998). Further research is required to consider the effects of imprisonment on remission; to clarify the motivation of pathological gamblers in prison to change their behaviour; and explore the implications of treatment options for prison life and future offending patterns.

3.7 Conclusion

The various matters addressed in this section of the review are particularly relevant to the design of three of the major elements of the NZGS, namely the National Prevalence Survey (Phases 1 and 2), the Longitudinal Follow-up of the 1991 National Survey Phase 2 Participants, and the Prison Study. While each of these studies will examine gambling participation, gambling expenditure and attitudes towards gambling, their primary focus is on problem gambling. Sections One and Two of this review also have relevance to the design of these studies, especially the final part of Section Two concerning methodological considerations.

In contrast to Shaffer, Hall and Vander Bilt (1997), who provided a methodological appendix based on their meta-analytic review and related discussion, we have chosen not to include an explicit checklist for the conduct of problem gambling prevalence studies. However, these matters have been examined throughout the review. To the reader of both reports, it will be evident that we broadly agree with the criteria explicated by Shaffer and his colleagues.

A major tension in the design of the three studies just mentioned arises from the need to ensure comparability with the earlier 1991 National Survey of Problem and Pathological Gambling (Abbott & Volberg, 1991; 1992; 1996a: Volberg & Abbott, 1994), while incorporating new developments

and addressing conceptual, methodological and analytic short-comings in previous research. This tension is particularly problematic in the case of the longitudinal study where comparability necessitates the repetition of many of the measures included in the original survey. There is more flexibility in the case of the prison study. How the various conceptual and methodological considerations and substantive research findings from the present review will specifically inform each of these studies will be discussed further in the reports and articles that arise from them.

Perhaps one matter does, however, warrant some discussion here. We agree with Lesieur (1994) that, ideally, prevalence surveys should include a random sample of all people within the population who are at risk for problem and pathological gambling. Lesieur has expressed particular concern about the omission of institutional populations from state and national prevalence studies and argued that this would result in biased prevalence estimates. While this review indicates that at least some of these groups, including prison inmates and people in residential alcohol and drug treatment programmes, do have higher prevalence rates than general community samples, even very high rates would not necessarily have a major influence on overall population estimates. For example, Abbott and Volberg (1997) have shown that if five percent of New Zealand prisoners were currently pathological gamblers (five times the 1991 general population estimate) this would have an insignificant impact on the overall prevalence estimate. The reason for this is that the prison population is very small relative to the total adult population. Similarly, the omission of other high risk groups will have little influence unless they are large.

A corollary of the foregoing, as mentioned earlier with respect to the Australian studies, is that the omission of very large groups with low prevalence rates can have a substantial impact and result in serious underestimation. This effect would only occur, however, if these groups are assumed to have a lower rate (e.g. zero in most of the Australian studies) than is in fact the case.

An important reason for conducting problem gambling prevalence surveys is to assess some of the adverse impacts, including social and economic costs of various forms of gambling, in a particular community or society. This is only one of many data sources that could be considered in undertaking a comprehensive social impact assessment or cost-benefit analysis. To date, few systematic attempts have been made to attach financial cost estimates to prevalence survey data and extrapolate these costs to general populations. One exception was Dickerson, Allcock & Blaszczynski et al's (1996) New South Wales study. While noting that this was "thorough" and "potentially the best done anywhere", Lesieur (1996) concludes, "it seriously underestimates the costs of problem gambling in several ways". Some of these "ways" were discussed earlier in this review with respect to methodological and conceptual shortcomings of the AIGR approach to problem gambling prevalence research.

While sharing Lesieur's concerns, we are of the view that the methodology developed by Dickerson, Baron, Hong & Cottrell's (1996) to draw on survey, clinical and other problem gambling data sources is innovative and holds promise as a means of quantifying many of the economic and social costs of problem gambling. Prevalence surveys are likely to be of more value to policymakers and other stakeholders if they are extended in this way and incorporated within a broad conceptual framework that examines wider ramifications throughout economic and social systems. Similarly, they will be more likely to contribute to the advancement of scientific understanding of gambling and problem gambling if they are closely linked to relevant bodies of knowledge and address hypotheses that arise from them.

REFERENCES

Abbott, M., Palmisano, B., & Dickerson, M. (1995). Video game playing, dependency and delinquency: A question of methodology? *Journal of Gambling Studies*, 11, 287-301.

Abbott, M.W. (1979). *Interrelations between cognitive factors in the prediction of relapse in chronic alcoholics.* Unpublished PhD Thesis, University of Canterbury.

Abbott, M.W. (1992). The impact of gaming on the community. In C. Scott (Ed.), *Lotteries, gaming and public policy* (pp. 75-85). Wellington: Institute of Policy Studies.

Abbott, M.W. (1994a). Mental health. In A. Trlin, J. Spicer, & J.A. Walton (Eds.), *Social science perspectives on health in New Zealand* (pp.119-140). Palmerston North: Dunmore Press.

Abbott, M.W. (1994b). *The gambling boom: Balancing social and commercial considerations in the 90's*. Invited keynote address, The New Zealand Gaming Industry National Conference, organised by the Institute for International Research, Centra Hotel, Auckland, 1-2 December, 1994.

Abbott, M.W. (1997a). Refugees and immigrants. In P.M.Ellis & S.C.D.Collings (Eds.), *Mental health in New Zealand from a public health perspective* (pp. 250-264). Wellington: Ministry of Health.

Abbott, M.W. (1997b). Problem Gambling: A confluence of new technology, hope and marginalisation. Paper presented at the 1997 World Congress for Mental Health, Lahti, Finland, 6-11 July 1997.

Abbott, M.W., Ariell, G., Varley, E., Whiteside, E., & Williams, B. (1991). *Queen Mary Hospital Review.* Wellington: Alcoholic Liquor Advisory Council.

Abbott, M.W., & Braun, D. (1989). *Prevention and mental health promotion*. Auckland: Mental Health Foundation of New Zealand.

Abbott, M.W., & Durie, M. (1986). A whiter shade of pale: Taha Mäori and professional psychology training. *New Zealand Journal of Psychology*, 16, 58-71.

Abbott, M.W., Rönnberg, S., & Volberg, R.A. (1997). *Some major conclusions from the pilot study of gambling and problem gambling in Sweden*. Report to the Sweden Ministry of Health and Social Affairs.

Abbott, M.W., Sullivan, S., & McAvoy, B. (1994a). The Compulsive Gambling Society of New Zealand National Telephone Hotline and Clinics: Report on their first year of operation. Auckland: Compulsive Gambling Society of New Zealand.

Abbott, M.W., Sullivan, S., McAvoy, B., & Arroll, B. (1994b). Pathological gamblers - will they use a new telephone hotline? *New Zealand Medical Journal, 107*, 313-315.

Abbott, M.W., & Volberg, R.A. (1991). *Gambling and problem gambling in New Zealand. Research Series No. 12*. Wellington: Department of Internal Affairs.

Abbott, M.W., & Volberg, R.A. (1992). *Frequent gamblers and problem gamblers in New Zealand. Research Series No. 14*. Wellington: Department of Internal Affairs.

Abbott, M.W., & Volberg, R.A. (1996a). The New Zealand National Survey of Problem and Pathological Gambling. *Journal of Gambling Studies*, 12, 143-160.

Abbott, M.W., & Volberg, R.A. (1996b). Gambling and pathological gambling: Growth industry and growth pathology. *Community Mental Health in New Zealand, 9* (2), 22-31.

Abbott, M.W., & Volberg, R.A (1997). Tender document for the National survey on problem and pathological gambling. Auckland: Author.

Abbott, M.W., Wong, S., Williams, W., Au, M., Young, W. (1999). Chinese migrants' mental health and adjustment to life in New Zealand. *Australian and New Zealand Journal of Psychiatry,* 33,13-21.

Abt, V., Smith, J.F., & Christiansen, E.M. (1985). *The business of risk: Commercial gambling in mainstream America*. Lawrence: University Press of Kansas.

AGB McNair. (1992). Community gambling patterns. Melbourne: Victorian Casino and Gaming Authority.

AGB McNair. (1994). Community gambling patterns. Melbourne: Victorian Casino and Gaming Authority.

Alberta Alcohol and Drug Abuse Commission. (1998). *Adult gambling and problem gambling in Alberta*. Edmonton, AB: Wynne Resources, Ltd.

Allcock, C. (1998). The diagnosis of problem gambling. In Compulsive Gambling Society of New Zealand. *Proceedings of the national workshop on treatment for problem gambling* (pp 23-28). Auckland: Author.

American Gaming Association. (1998*).* Update: An Industry-wide effort to combat problem gambling. *International Gaming & Wagering Business, 19* (6), 10.

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders, third edition.* Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders, fourth edition*. Washington, DC: Author.

Andreski, S. (1972). *Social sciences as sorcery*. London: Deutsh.

Auditor General of Victoria. (1998). *Special Report No. 54. Victoria's Gaming Industry: An insight into the role of the regulator*. Melbourne: Victorian Government Printer.

Australian Institute for Gambling Research. (1994). *A critical evaluation of two national studies: The case for alternative strategies*. Campbelltown; Australia: Author.

Australian Institute for Gambling Research. (1995). *The extent, nature and predictors of problems associated with machine gaming in Queensland: A survey-based analysis and assessment.* Campbelltown, Australia: Author.

Australian Institute for Gambling Research. (1998). *Study of the social and economic impacts of New Zealand casinos*. Final report. Campbelltown, Australia: Author.

Australian Institute for Gambling Research & Labour and Industry Research Unit, University of Queensland. (1995). *Report of the first year of the study into the social and economic impact of the introduction of gaming machines to Queensland clubs and hotels*. Brisbane: Department of Families, Youth and Community Care.

Australian Institute for Gambling Research & Labour and Industry Research Unit, University of Queensland. (1996). *Long term study into the social impact of gaming machines in Queensland. An issues paper: The social and economic impact of gaming machines on Aboriginal and Torres Strait islander Communities in Queensland*. Brisbane: Department of Families, Youth and Community Care.

Austrin, T. (1998). Retailing leisure: Local and global developments in gambling. In C.C. Perkins & G. Cushman (Eds.), *Time out? Leisure, recreation and tourism in New Zealand and Australia* (pp. 167-181). Auckland: Longman.

Bannister, P., Burman, E., Parker, I., Taylor, M., & Tindall, C. (1994). *Qualitative methods in psychology: A research guide*. Buckingham, England: Open University Press.

Barnhart, R.T. (1992). Gambling in Revolutionary Paris: The Palais Royale, 1789-1838. *Journal of Gambling Studies, 8,* 151-166.

Baron, E., & Dickerson, M.G. (1998). *Alcohol consumption and self control of gambling behaviour*. Paper submitted for publication.

Becoña, E. (1991). *The prevalence of pathological gambling in Galicia*.(Spain). Paper presented at the Annual Conference of the Society for the Study of Gambling. London, England.

Becoña, E. (1993). The prevalence of pathological gambling in Galicia, (Spain). *Journal of Gambling Studies*, *9*, 353-369.

Becoña, E. (1996). Prevalence surveys of problem and pathological gambling in Europe: The cases of Germany, Holland and Spain. *Journal of Gambling Studies*, *12*, 179-192.

Becoña, E., & Fuentes, M. J. (1994). *The pathological gambling evaluated by the South Oaks Gambling Screen*. Paper presented at the 23rd International Congress of Applied Psychology.

Bellringer, P. (1986). Gambling and crime: A prison perspective. *Society for the Study of Gambling Newsletter*, *9 (*May), 9-12.

Bivins, J., & Hahnke, J. (1998). The new path to profits: Technology strategies for the gaming industry. *Special supplement to International Gaming and Wagering Business.* Sponsored by KPMG Peat Marwick. (June 1998).

Bland, R.C., Newman, S.C., Orn, H., & Stebelsky, G. (1993). Epidemiology of pathological gambling in Edmonton. *Canadian Journal of Psychiatry, 38,* 108-112.

Blaszczynski, A., Dumlao, V., & Lange, M. (1997). How much do you spend gambling? Ambiguities in survey questionnaire items. *Journal of Gambling Studies, 13*, 237-252.

Blaszczynski, A.P., & McConaghy, N. (1994a). Antisocial personality disorder and pathological gambling. *Journal of Gambling Studies, 10*, 129-145.

Blaszczynski, A.P., & McConaghy, N. (1994b). Criminal offences in Gamblers Anonymous and hospital treated pathological gamblers. *Journal of Gambling Studies, 10*, 99-127.

Blaszczynski, A.P., & Silove, D. (1996). Pathological gambling: Forensic issues. *Australian and New Zealand Journal of Psychiatry, 30*, 358-369.

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

Breen, H., Hing, N., & Weeks, P. (1997). Characteristics of Sydney populations which support poker machine gaming in clubs. In G. Coman, B. Evans & R. Wootton (Eds.), *Responsible gambling: a future winner* (pp.35-51). Melbourne: National Association for Gambling Studies.

Brogan, D.J. (1997). *Pitfalls of using standard statistical software packages for sample survey data*. Atlanta: Rollins School of Public Health, Emory University.

Brown, R. (1998). Problem gambling among people on community corrections. In Compulsive Gambling Society of New Zealand. *Proceedings of the national workshop on treatment for problem gambling.* Auckland: Author.

Brown, R.I.F. (1987). Pathological gambling and associated patterns of crime: Comparisons with alcohol and other drug addictions. *Journal of Gambling Behavior, 3*, 98-114.

Brown, R.I.F., & Fisher, S.E. (1996). *The social implications of casino gambling.* London: Home Office.

Buhringer, G., & Konstanty, R. (1992). Intensive gamblers in German-style slot machines. *Journal of Gambling Studies, 8*, 21-38.

Bulkeley, W. M. (1992). Video betting, called 'Crack of Gambling', is spreading. *Wall Street Journal* (July 14, 1992), B1.

Bureau of Indian Affairs. (1998). The tribal state compact list. Website accessed 21 July 1998, *www.doi.gov/bia/foia/compact.htm*.

Campbell, C. (1994). *Gambling in Canada: The bottom line*. Vancouver: Simon Fraser University.

Campbell, C.S., & Smith, G.J. (1998). Canadian gambling: Trends and public policy issues. *Annals of the American Academy of Political and Social Science*, 556, 22-35.

Canadian Gaming News. (1998). 47, 11.

Carpenter, D.E. (1988). Fickle fortune*:* Gambling in medieval Spain. *Studies in Philology*, *85* (3), 267-278.

Castles, S., & Miller, M.J. (1993). *The age of migration: International population movements in the modern world.* New York: Guilford Press.

Cayuela, R., & Guirao, J.L. (1991). Characteristics and situation of gambling addiction in Spain. In W.R. Eadington & J.A. Cornelius (Eds.), *Gambling and public policy: International perspectives*, Reno: University of Nevada Press.

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

Christiansen, E.M. (1998). The United States 1997 gross annual wager: A new entitlement. *International Gaming and Wagering Business, 19* (8), Supplement.

Christoffel, P. (1992). *People's participation in and attitudes towards gambling*. Wellington: Department of Internal Affairs.

Clotfelter, C.T., & Cook, P.J. (1989). *Selling hope: State lotteries in America*. Cambridge: Harvard University Press.

Compulsive Gambling Society of New Zealand. (1997). *Clinical report 1996.* Auckland: Author.

Compulsive Gambling Society of New Zealand. (1998). *Clinical report 1997.* Auckland: Author.

Connor, M., Kelly, J., & Parets, R.J. (1996). Slot machines: The next generation. *Supplement to International Gaming and Wagering Business*. (May, 1996).

Cosby, A.G., May, D.C., Frese, W., & Dunaway, R.G. (1996). Legalization of crimes against the moral order: Results from the 1995 National survey of gaming and gambling. *Deviant Behavior: An Interdisciplinary Journal, 17*, 369-389.

Cox, S., Lesieur, H.R., Rosenthal, R.J., & Volberg, R.A. (1997). *Problem and pathological gambling in America: The national picture*. Report prepared by the Research and Public Policy Committees of the National Council on Problem Gambling. Columbia, MD: National Council on Problem Gambling.

Culleton, R.P. (1989). The prevalence rates of pathological gambling: A look at methods. *Journal of Gambling Behavior, 5*, 22-41.

Cunningham-Williams, R.M., Cottler, L.B., Compton, W.M., & Spitznagel, E.L. (1998). Taking chances: Problem gamblers and mental health disorders - results from the St. Louis Epidemiologic Catchment Area Study. *American Journal of Public Health, 88*, 1093-1096.

Custer, R. L. (1984). Profile of the pathological gambler. *Journal of Clinical Psychiatry, 45*, 35-39.

Custer, R. L., & Milt, H. (1985*). When luck runs out: Help for compulsive gamblers and their families*. New York: Facts on File.

DBM Consultants. (1995). *Report on the findings of the survey of community gambling patterns, Volumes 1-3.* Melbourne: Victorian Casino and Gaming Authority.

Delfabbro, P.H., & Winefield, A.H. (1996a). *Community gambling patterns and the prevalence of gambling-related problems in South Australia (with particular reference to gaming machines).* Adelaide: Department of Psychology, University of Adelaide.

Delfabbro, P.H., & Winefield, A.H. (1996b). Community gambling patterns: Findings from the 1996 statewide study of the prevalence of gambling related problems in South Australia. In B. Tolchard (Eds.), *Towards 2000: The future of gambling*. Adelaide: National Association for Gambling Studies.

Department of Internal Affairs. (1990). *Review of gambling in New Zealand*. Wellington: Author.

Department of Internal Affairs. (1995a*). Overview of gaming and gambling issues present and future.* Wellington: Author.

Department of Internal Affairs. (1995b). *Review of Gaming - a discussion document*. Wellington: Author.

Department of Internal Affairs. (1995c). *Synopsis of submissions to the 1995 Review of Gaming discussion document*. Wellington: Author.

Department of Internal Affairs. (1995d). *The social impact of gaming in New Zealand: A report prepared for the 1995 Review of Gaming.* Wellington: Author.

Department of Internal Affairs. (1995e). *The economic impact of gaming in New Zealand: A report prepared for the 1995 Review of Gaming.* Wellington: Author.

Department of Internal Affairs. (1995f). *The impact of technology on new and existing forms of gaming in New Zealand*. Wellington: Author.

Department of Internal Affairs. (1995g). *Public participation in and attitudes towards gambling: Preliminary results of the 1995 survey by the Department of Internal Affairs. Research Series No. 21*. Wellington: Author.

Department of Internal Affairs. (1996). *Gaming - a new direction for New Zealand*. Wellington: Author.

Department of Internal Affairs. (1999). *Gaming Statistics*. Wellington: Author.

Department of Statistics. (1990). *Household expenditure and income survey 1989/90.* Wellington: Author.

Department of Statistics. (1995). *Household economic survey 1994/95.* Wellington*:* Author.

Department of Treasury and Finance. (1995) *Inquiry into the Impact of Gaming Machines in South Australia*. (1995). Adelaide: Author.

Derevensky J.L., & Gupta, R. (1997). *Prevalence estimates of adolescent gambling*: *A comparison of the SOGS-RA, DSM-IV-J and the G.A. 20 Questions*. Paper presented at the 10th International Conference on Gambling and Risk Taking. Montreal, Quebec (31 May –4 June, 1997).

Deutsch, D. (1997). *The fabric of reality.* London: Penguin Books.

Devereux, E.C. (1968). Gambling. *The international encyclopedia of the social sciences, 6.* New York: MacMillan.

Dickerson, M.G. (1984). *Compulsive Gamblers.* London: Longman.

Dickerson, M. (1992). *Problem gambling in Australia*. Sydney: Australian Institute for Gambling Research.

Dickerson, M.G. (1993). Internal and external determinants of persistent gambling: Problems in generalising from one form of gambling to another. *Journal of Gambling Studies, 9,* 225-245.

Dickerson, M.G. (1997). *Pathological gambling: Or what's in a name?* Paper presented at the 10th International Conference on Gambling and Risk Taking. Quebec (31 May-4 June).

Dickerson M., Allcock, C., Blaszczynski, A., Nichols, B., Williams, J., Maddern, R. (1996). *Study 2. An examination of the socio-economic effects of gambling on individuals, families and the community, including research into the costs of problem gambling in New South Wales.* Sydney: University of Western Sydney, Macarthur.

Dickerson, M.G., & Baron, E. (1998). Contemporary issues and future directions in research into pathological gambling, or flags in the desert. Paper submitted for publication.

Dickerson, M.G., Baron, E., & O'Connor, J. (1994). *Measuring the extent and degree of gambling related problems in Western Australia.* Report to the Department of Racing and Gaming, Western Australia.

Dickerson, M.G., Baron, E., Hong, S.M., & Cottrell, D. (1996). Estimating the extent and degree of gambling related problems in the Australian population: A national survey. *Journal of Gambling Studies, 12*, 161-178.

Dickerson, M., & Maddern, R. (1997). *The extent and impact of gambling in Tasmania with particular reference to problem gambling.* Campelltown: Australian Institute for Gambling Research, University of Western Sydney.

Dickerson, M., McMillen, J., Hallebone, E., Volberg, R., & Woolley, R. (1997). *Definition and incidence of problem gambling, including the socio-economic distribution of gamblers.* Melbourne: Victorian Casino and Gaming Authority.

Dickerson, M., Walker, M, & Baron, E. (1994). *A baseline study of the extent and impact of gambling in Tasmania with particular reference to problem gambling*. Campelltown: Australian Institute for Gambling Research, University of Western Sydney.

Dixey, R. (1987). It's a great feeling when you win: Women and bingo. *Leisure Studies, 6,* 199-214.

Dohrenwend, B.P. (1995), *The problem of validity in field studies of psychological disorders revisited.* In M.T. Tsuang, M.Tohen & G.P. Zahner (Eds.), Textbook in psychiatric epidemiology (pp. 3-20). New York: Wiley-Liss.

Doocey, P. (1996). United States: Gaming scores in Michigan and Arizona. *International Gaming and Wagering Business,* 17, 12, 1-4.

Drake, S.C., & Cayton, H. (1945). *Black metropolis*. New York, NY: Harcourt Brace and Co.

Eadington, W.R. (1991). Public policy considerations and challenges and the spread of commercial gambling. In W.R. Eadington & J.A. Cornelius (Eds). *Gambling and public policy*: *International perspectives* (pp.3-12). Reno: University of Nevada Press.

Eadington, W.R. (1992). *Emerging public policy challenges from the proliferation of gaming in America.* Paper presented at the Second Australasian Conference on Casinos and Gaming. Sydney, 27-28 October, 1992.

Emerson, M.O., & Laundergan. J.C. (1996). Gambling and problem gambling among adult Minnesotans: Changes 1990 to 1994. *Journal of Gambling Studies*, 12, 291-304.

Fact Research. (1976). Gambling in perspective. In Fact Research, Inc. (Ed). *Gambling in America: Appendix 1*. Washington, DC: Commission on the Review of the National Policy Toward Gambling.

Faraone, S.V., & Tsuang, M.T. (1994). Measuring diagnostic accuracy in the absence of a 'gold standard'. *American Journal of Psychiatry*, *151*, 650-657.

Ferrel, D., & Gold. M. (1998). Casino industry fights an emerging backlash. *Los Angeles Times,* A1, A24-A25 (December 14).

Festinger, L. (1957). *A theory of cognitive dissonance*. New York: Harper &Row.

Findlay, J.M. (1986). *People of chance: Gambling in American society from Jamestown to Las Vegas*. New York: Oxford University Press.

Fisher, S.E. (1996). *Gambling and problem gambling among casino patrons*. Report to the British Casino Industry Consortium.

Fisher, S.E. (1998). *Gambling and problem gambling among young people in England and Wales*. Report to the Office of the National Lottery.

Foote, R. (1996a). Aboriginal gambling: Forces, phases and factors in development. In B.Tolchard (Ed.), *Towards 2000: The future of gambling* (pp. 183-187). Adelaide: National Association for Gambling Studies.

Foote, R. (1996b). Aboriginal casino attendance in Darwin. In B.Tolchard (Ed.)*, Towards 2000: The future of gambling* (pp. 169-181). Adelaide: National Association for Gambling Studies.

France, C.J. (1902). The gambling impulse. *American Journal of Psychology, 13*, 364-407.

Freud, S. (1928). Dostoevsky and Parracide. *The standard edition of the complete works of Sigmund Freud*. J. Starchey (Ed. and translator), Vol. 21, 222-242. London: Hogarth Press.

Gabriel, K. (1996). *Gambler way: Indian gaming in mythology, history and archaeology in North America*. Boulder, CO: Johnson Books.

Gambino, B. (1997). Method, method: who's got the method? What can we KNOW about the number of compulsive gamblers? *Journal of Gambling Studies, 13*, 291-296.

Gamblers Anonymous. (1985). *Gamblers Anonymous*. Los Angeles, CA: Gamblers Anonymous National Service.

Geertz, C. (1973). Deep play: Notes on the Balinese cockfight. In C. Geertz (Ed), *The interpretation of cultures* (pp. 412-453). New York: Basic Books.

Goodman, R. (1995). *The luck business*: *The devastating consequences and broken promises of America's gambling explosion.* New York: Free Press.

Grant, D. (1994). *On a roll: A history of gambling and lotteries in New Zealand*. Wellington: Victoria University Press.

Griffiths, M.D. (1995). *Adolescent gambling*. London: Routledge.

Griffiths, M.D. (1998a). *Gambling into the millennium: Issues of concern and potential concern.* Paper presented at the National GamCare Conference, Adelaide, 6 May, 1998.

Griffiths, M.D. (1998b). *The way ahead: Internet, technology and problems - what can we expect?* Paper presented at the National GamCare Conference, Adelaide, 6 May, 1998.

Guilford, J.P. (1959*). Personality.* New York, NY: McGraw-Hill*.*

Handler, B., & McQueen, P.A. (1998). Building for the future. *Bilingual Supplement to International Gaming and Wagering Business,* 19,11.

Henriksson, E. (undated). *Gambling expansion: Is this a recipe for trouble?*

Henriksson, L.E., & Lipsey, R.G. (in press). Should provinces expand gambling? *Canadian Public Policy/ Analyse Politiques.*

Henslin, J. (1967). Craps and magic. *American Journal of Sociology*, *73*, 316-330.

Hepworth, K. (1999). Aussie states mixed on net bets. *International Gaming and Wagering Business*. 20(5), 22.

Heubusch, K. (1997). *Taking chances on casinos. American demographics*. May 1997. (www.demographics.com).

Hippler, H.J., Schwarz, N., & Sudman, S., (Eds.). (1987). *Social information processing and survey methodology*. New York: Springer Varlag.

Hirsch, A.R. (1995). Effects of ambient odors on slot machine usage in a Las Vegas casino. *Psychology of Marketing, 12*, 585-594.

Hollander, E, & Wong, C.M. (1995). Body dysmorphic disorder, pathological gambling, and sexual compulsions. *Journal of Clinical Psychiatry, 56* (Suppl 4), 7-12.

Home Office. (1996). *Casinos and bingo clubs: A consultation paper*. London: Author.

Horn, B.P. (1997). The courage to be counted. *Journal of Gambling Studies*, 13, 301-307.

Hraba, J., & Lee, G. (1996). Gender, gambling and problem gambling. *Journal of Gambling Studies, 12*, 83-101.

Hugick, L. (1989). Gambling on the rise: Lotteries lead the way. *Gallup Report 285*, 32-41.

IGWB Online. (1997). *1996 gross annual wager: Growth in gaming industry slowed last year in both handle and revenue. http://www/igwb.com/news/gaw.html.*

Jacobs, D.F. (1989). Illegal and undocumented: A review of teenage gambling and the plight of children of problem gamblers in America. In H.J. Shaffer, S.A. Stein, B.Gambino, & T.N. Cummings, (Eds.) *Compulsive Gambling*: *Theory, research and practice.* Boston: Lexington Brooks.

Jacobs, D.F. (1993). Evidence supporting a general theory of addiction. In W.R. Eadington & J.A. Cornelius (Eds), *Gambling behaviour and problem gambling*. (pp. 287-294). Reno, NV: University of Nevada Press.

Jacques, C., Ladouceur, R., Ferland, F., & Giroux, I. (1997). *Prevalence of problem gambling in Quebec seven years after the first prevalence study*. Paper presented at the 10th International Conference on Gambling and Risk Taking. Montreal, Canada. (May 31-June 4, 1997).

Jefferson, G. (1998). Investors gamble on centers: Treating addiction is duo's goal. *Indianapolis Business Journal*. (Website accessed 30June, 1998).

Johnson, E.E., Hamer, R.M. & Nora, R.M. (1998). The lie/bet questionnaire for screening pathological gamblers: A follow-up study. *Psychological Reports* 83: 1219-1224.

Jones, G. (1990). The prevalence and characteristics of prisoners with gambling related problems in Canning Vale Remand Centre. *National Association for Gambling Studies Newsletter, 2* (2), 5-15.

Kallick, M., Suits, D., Dielman, T., & Hybels, J. (1979*). A survey of American gambling attitudes and behavior.* Research Report Series, Survey Research Center, Institute for Social Research. Ann Arbor: University of Michigan Press.

Kazdin, A.E. (1978). Methodological and interpretive problems of single-case experimental designs. *Journal of Consulting and Clinical Psychology, 4*, 629-642.

Kelly, J. (1998). Australia: Two states tackle Internet games. *International Gaming and Wagering Business,* 19(4), 11.

Kennedy, H.G., & Grubin, D.H. (1990). Hot headed or impulsive? *British Journal of Addiction, 85*, 639-643.

Kent-Lemon, N. (1998). Global view: Cities and slots are the future. *International Gaming and Wagering Business,* 19(4), 34-35.

Kish, L. (1984). On analytical statistics from complex surveys. *Survey Methodology, 10*(1), 1-6.

Kutchins, H., & Kirk, S.A. (1997). *Making us crazy - DSM*: *The psychiatric bible and the creation of mental disorders*. New York: The Free Press.

Kwan, K. (1997). *Gambling, alcohol and other drug uses among Chinese adults in Greater Toronto: A summary of a telephone survey*. Toronto: Chinese Family Life Services of Metro Toronto.

Kyndon, A., & Dickerson, M.G. (1998). An experimental study of the effects of prior consumption of alcohol on a simulated gaming activity. Paper submitted for publication.

Ladouceur, R. (1996). Prevalence of pathological gamblers in Canada and related Issues. *Journal of Gambling Studies*, 12, 129-142.

Laundergan, J.C., Schaefer, J.M., Eckhoff, K.F., & Pirie, P.L. (1990). *Adult survey of Minnesota gambling behavior: A benchmark. (1990).* Report to the Minnesota Department of Human Services, Mental Health Division.

Laventhol & Horwath. (1986*). The effects of legalized gambling on the citizens of the State of Connecticu*t. Report to the Connecticut Division of Special Revenue.

Legarda, J.J.Babio, R., & Abreu, J.M. (1992). Prevalence estimates of pathological gambling in Seville, (Spain). *British Journal of Addiction, 87*, 767-770.

Lesieur, H.R. (1984). *The chase: Career of the compulsive gambler*. Cambridge: Schenkman.

Lesieur, H.R. (1987), Gambling, pathological gambling and crime. In T. Glaski (Ed.), *Handbook on pathological gambling*. Springfield, United States: Thomas Publishers.

Lesieur, H.R. (1994). Epidemiological surveys of pathological gambling: Critique and suggestions for modification. *Journal of Gambling Studies, 10*, 385-398.

Lesieur, H.R. (1996). Measuring the costs of pathological gambling. In B. Tolchard (Ed.). *Towards 2000: The future of gambling.* (pp. 11-22). Adelaide: National Association for Gambling Studies.

Lesieur, H.R., & Blume, S.B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144,* 1184-1188.

Lesieur, H.L., & Puig, K. (1987). Insurance problems and pathological gambling. *Journal of Gambling Behavior, 3*, 123-135.

Lesieur, H.L., & Rosenthal, R.J. (1991). Pathological gambling: A review of the literature (Prepared for the American Psychiatric Task Force on DSM-IV Committee on Impulse Control Disorders Not Elsewhere Classified). *Journal of Gambling Studies*, 7, 5-39.

Lesieur, H.R., & Rosenthal, R.H. (1998). *Analysis of pathological gambling*. In T.A. Widiger, A.J. Francis, H.A. Pincus, R. Ross, M.B. First, W. Davis, & M. Kline (Eds.), DSM-IV sourcebook. Volume 4 (pp. 393-401). Washington DC: American Psychiatric Association.

Letarte, A., Ladouceur, R., & Mayrand, M. (1986). Primary and secondary illusory control and risk taking in gambling (roulette). *Psychological Reports, 58*, 299-302.

Levey, S. (1984). Gambling and offending. *Society for the Study of Gambling Newsletter, 5* (April), 9-15.

Light, I. (1977). Numbers gambling among Blacks: A financial institution. *American Sociological Review, 42*, 892-904.

Lynch, R. (1992). Working class luck and vocabularies of hope among regular poker machine players. In D. Rowe & G. Lawrence (Eds.), *Sport and leisure: Trends in Australian popular culture.* Sydney: Harcourt, Brace and Jovanovich.

Maden, T., Swinton, M., & Gunn, J. (1992). Gambling in young offenders. *Criminal Behaviour and Mental Health, 2*, 300-308.

Maher, B.A. (1978). A reader's, writer's and reviewer's guide to assessing research reports in clinical psychology. *Journal of Consulting and Clinical Psychology, 46*, 835-838.

Mahoney, M.J. (1978). Experimental methods and outcome evaluation. *Journal of Consulting and Clinical Psychology, 46*, 660-672.

Manly, B.F.J. & Gonzalez, L. (1993). *A confidence interval for the number of pathological gamblers in New Zealand.* Dunedin: Centre for Applications of Statistics and Mathematics, University of Otago.

McCormick, R.A., Russo, A.M., Ramirez, L.R., & Taber, J.I. (1984). Affective disorders among pathological gamblers seeking treatment. *American Journal of Psychiatry, 141*, 215-218.

McCormick, R. A., Taber, J., Krudelbach, N., & Russo, A. (1987). Personality profiles of hospitalized pathological gamblers: The California Personality Inventory. *Journal of Clinical Psychology 43,* 521-527.

McGowan, R. (1997). The ethics of gambling research: An agenda for mature analysis. *Journal of Gambling Studies*, 13, 279-289.

McMillen, J. (1996a). The state of the play: Policy issues in Australian gambling. In B. Tolchard (Ed). *Towards 2000: The future of gambling*.(pp.1-9). Adelaide: National Association for Gambling Studies.

McMillen, J. (1996b). The globalisation of gambling: Implications for Australia. *The National Association for Gambling Studies Journal, 8*(1), 9-19.

McQueen, P.A. (1997). Special report: Gaming in the Internet: lottery. Bordering on growth. *International Gaming and Wagering Business*, *18* (4), 55.

McQueen, P.A. (1998). North American gaming at a glance*. International Gaming and Wagering Business, 19* (9), 20-22.

McQueen, P.A., Rzadzki, J., Keyes, J.F. & Jones, M. (1998). Ticket to the future: IGWB's lottery technology review. *Supplement to International Gaming and Wagering Business.* 19,10*.*

Meehl, P.E. (1954). *Clinical versus statistical prediction: A theoretical analysis and a review of the evidence.* Minneapolis: University of Minnesota Press.

Meehl, P.E. (1978). Theoretical risks and tabular asterisks: Sir Karl, Sir Ronald, and the slow progress of soft psychology. *Journal of Consulting and Clinical Psychology*, *46,* 806-834.

Messick, S. (1995). Validity of psychological assessment. *American Psychologist*, *50*, 741-749.

Metz, C. (1978). Basic principles of ROC analysis. *Seminars in Nuclear Medicine, 8* (4), 283-298.

Meyer, G. & Fabian, T. (1992). Delinquency among pathological gamblers: A causal approach. *Journal of Gambling Studies, 8*, 61-77.

Meyer, G. & Stadler, M. (1998). *Criminal behaviour associated with pathological gambling.* Paper presented at the 42nd International Institute on the Prevention and Treatment of Dependencies. Malta (August 1998).

Meyers, L.S., & Grossen, N.E. (1978). *Behavioral research: theory, procedure and design. San Francisco:* W.H.Freeman and Company.

Ministry of Health. (1996*). Guidelines for the assessment and treatment of pathological gambling*. Wellington: Author.

Mississippi State University Gambling Group. (1995). National gambling survey. Starkville, MS: MSU Social Sciences Research Center.

Mok, W.P., & Hraba, J. (1993). Age and gambling behaviour: A declining and shifting pattern of participation. In W.R. Eadington & J.A. Cornelius (Eds.), *Gambling and problem gambling* (pp. 51-74). Reno: University of Nevada Press.

Nadler, L.B. (1985). The epidemiology of pathological gambling: Critique of existing research and alternate strategies. *Journal of Gambling Behavior, 1*, 35-50.

National Opinion Research Center. (1999a). *Overview of national survey and community database research on gambling behavior.* Report to the National Gambling Impact Study Commission, U.S.A.

National Opinion Research Center. (1999b). *Gambling impact and behaviour study.* Report to the National Gambling Impact Study Commission, U.S.A.

New South Wales Department of Gaming and Racing. (1995). *Gaming analysis 1993-94.* Sydney: Author.

North Health. (1996). *Interim report on problem gambling management prepared for Committee on Problem Gambling Management.* Auckland: Author.

Novak,V. (1998). They call it video crack. *Time* (June 1, 1998), 58-59.

O'Hara, J. (1987). Getting a stake: Gambling in early colonial Australia. *Journal of Gambling Behavior*, 3, 41-59.

O'Hara, J. (1988). *A mug's game: A history of gambling and betting in Australia*. Kensington: University of New South Wales Press.

Oldman, D.J. (1978). Compulsive gamblers. *Sociological Review,* 26, 349-371.

Orford, J. (1984). *Excessive appetites: A psychological view of addictions*. Chichester: UK: Wiley.

O'Sullivan, J., & Christoffel, P. (1992). In C. Scott (Ed.), *Lotteries, gaming and public policy* (pp. 61-69). Wellington: Institute of Policy Studies.

Palermo, D. (1999). Mississippi's machine miracle. *Slot Manager (Spring 1999). Quarterly Supplement to International Gaming and Wagering Business.*

Pasternak A. (1998). *Prevalence of gambling disorders in a primary care setting*. Paper presented at the 12th National Conference on Problem Gambling, Las Vegas, NV (June 18-20).

Perez, E. (in press). *What's on the cards: A literature review of the social and economic impacts of casinos*. Wellington: Department of Internal Affairs.

Phillips, J. (1987). *A man's country? The image of the Pakeha male: A history*. Auckland: Penguin Books.

Polzin, P.E., Baldridge, J., Doyle, D., Sylvester, J.T., Volberg, R.A., & Moore, W.L. (1998). From convenience stores to casinos*:* Gambling – Montana style. *Montana Business Quarterly* 36 (4), 2-14.

Popper, K.R. (1962). *Conjectures and refutations*. New York: Basic Books.

Popper, K.R. (1972). *Objective knowledge*. Oxford, England: Oxford University Press.

Productivity Commission. (1998). *Australia's gambling industries: Issues paper*. Canberra: Author. www.pc.gov.au

Queensland Department of Family Services and Aboriginal and Island Affairs. (1995). *Report on the first year of the study into the social and economic impact of the introduction of gaming machines into clubs and hotels.* Brisbane: Author.

Queensland Office of Gaming Regulation. (1998). *Interactive Gambling (Player Protection) Act*. (www.qogr.qld.gov.au)

Ramirez, L. F., McCormick, R.A., Russo, A.M., & Taber, J.I. (1983). Patterns of substance abuse in pathological gamblers undergoing treatment. *Addictive Behaviors, 8,* 425-428.

Reid, K., & Searle, W. (1996). *People's participation in and attitudes towards gambling: final results of the 1995 survey. Research Series No. 22.* Wellington: Department of Internal Affairs.

Remmers, P. (1997). *A Dutch treat: the gaming industry's response to problem gambling in the Netherlands.* Paper presented at the 10th International Conference on Gambling and Risk Taking, Montreal, Canada. (May-June 1997).

Rönnberg, S., Abbott, M.W., & Volberg, R.A. (1996). Swedish pathological gambling prevalence study: Original proposal. Proposed to the Ministry of Finance. (August 22, 1996).

Rönnberg, S., Abbott, M.W., & Volberg, R.A. (1998). *Problem gambling in Sweden: Some results from the Swedish Pathological Gambling Prevalence Study*. Paper presented at the 3d European Conference on Gambling Studies and Policy Issues. Munich, Germany, July 1-4, 1998.

Rönnberg, S., Volberg, R., Abbott, M.W., Moore, L., Andrén, A., Munck, I., Jonsson, J., Nilssen, T., & Svensson, O. (1999). *Gambling and Problem Gambling in Sweden. Report No. 2 of the National Institute of Public Health Series on Gambling*. Stockholm: National Institute of Public Health.

Rose, I.N. (1985). Gambling and the law: Endless fields of dreams. *Journal of Gambling Studies, 11*, 15-33.

Rose, I.N. (1986). *Gambling and the law.* Hollywood, CA: Gambling Times Incorporated.

Rose, I.N. (1999). The myth of the level playing field. *Casino Executive* (April 26, 1999).

Rosecrance, J. (1985). Compulsive gambling and the medicalisation of deviance. *Social Problems, 32,* 275-284.

Rosecrance, J. (1987). Bookmaking: A case where honesty is the best policy. *Sociology and Social Research, 72*(1), 7-11.

Rosecrance, J. (1988). *Gambling without guilt: The legitimation of an American pastime*. Belmont, CA: Wadsworth.

Rosenthal, R, & Lorenz, V. (1992). The pathological gambler as criminal offender: Comments on evaluation and treatment. *Psychiatric Clinics of North America, 15*, 647-659.

Scarne, J. (1973). *Scarne's encyclopedia of games*. New York, NY: Harper and Row.

Schachter, T., & Nathan, P.E. (1977). But is it good for the psychologists? Appraisal and status of DSM-III. *American Psychologist, 32*, 1017-1025.

Schwarz, N. (1999). Self-reports. How the questions shape the answers. *American Psychologist, 2,* 93-105.

Schwarz, N., & Sudman, S., (Eds.). (1996). *Answering questions: Methodology for determining cognitive and communicative processes in survey research.* San Francisco: Jossey-Bass.

Scripps Howard News Service and Ohio University. (1998). *Recent Bush Center Research Projects: Gambling*. http://www.scripps.ohiou.edu/research.htm#gamble.

Shaffer, H.J. (1997). *Gambling research and science: Toward a mature relationship. Journal of Gambling Studies, 13*, 275-278.

Shaffer, H.J., Hall, M.N., & Vander Bilt, J. (1997). *Estimating the prevalence of disordered gambling behavior in the United States and Canada: A meta-analysis*. Boston, MA: Harvard Medical School Division of Addictions.

Simmel, E. (1920). Psychoanalysis of the gambler. *International Journal of Psychoanalysis, 1,* 352-353.

Sinclair, S. (1997). By the numbers: Internet casino growth predicted. *International Gaming and Wagering Business, 18* (3), 17.

Sinclair, S. (1998). By the numbers: Cybergaming's limited market. *International Gaming and Wagering Business, 19* (3), 12.

Solonsch. M. (1991). The Australian gambling market: An overview of today and a look to the future. *The National Association for Gambling Studies Newsletter, 3* (2), 2-16.

Spinrad, L. & Spinrad, T. (1979). *Speaker's lifetime library*. New York: Parker Publishing Company, Inc.

State Government of Victoria. (1994). *Review of electronic gaming machines in Victoria*. Melbourne: Author.

Stinchfield, R. (1997). *Reliability, validity and classification accuracy of the South Oaks Gambling Screen (SOGS)*. Paper presented at the 10th International Conference on Gambling and Risk Taking. Montreal, Canada.

Stinchfield, R.,Cassuto, N.Winters, K.,& Latimer, W. (1997). Prevalence of gambling among Minnesota public school students in 1992 and 1995. *Journal of Gambling Studies, 13,* 25-48.

Stinchfield, R., & Winters, K.C. (1998). Gambling and problem gambling among youths. *Annals of the American Academy of Political and Social Science* (Gambling: Socioeconomic Impacts and Public Policy, J. H. Frey, special editor). March, 172-185.

Strachan, M. L., & Custer, R.L. (1993). Female compulsive gambling in Las Vegas. In W.R. Eadington & J.A. Cornelius (Eds.), *Gambling behavior and problem gambling* (pp. 235-238). Reno: Institute for the Study of Gambling and Commercial Gaming, College of Business Administration, University of Nevada Press.

Sullivan, S., Abbott, M.W. & McAvoy, B. (1994). Evaluation of the National Gambling Hotline and associated clinics for pathological gamblers. Auckland: Compulsive Gambling Society.

Sullivan, S., Arroll, B., Coster, G.D.,& Abbott, M.W. (1998). Problem gamblers: A challenge for GPs. *New Zealand Family Physician, 25*(1), 37-42.

Sullivan, S., McCormick, R. & Sellman, D. (1997). Increased requests for help by problem gamblers: Data from a gambling crisis hot line. *New Zealand Medical Journal, 110,* 380-383.

Svendsen, R. (1998). *Gambling among older Minnesotans*. Paper prepared for the National Research Council, Committee on the Social and Economic Impact of Pathological Gambling.

Taber, J. I., McCormick, R.A., & Ramirez, L.F. (1987). The prevalence and impact of major life stressors among pathological gamblers. *The International Journal of the Addictions, 22,* 71-79.

Tasmanian Gaming Commission. (1998). Australian Gambling Statistics. Hobart: Author.

Tasmanian Gaming Commission. (1999). Australian Gambling Statistics. Hobart: Author.

Templer, D., Kaiser, G., & Siscoe, K. (1993). Correlates of a pathological gambling propensity in prison inmates. *Comprehensive psychiatry, 32*, 347-351.

Templer, D., Moten, J., & Kaiser, G. (1994). Casino gaming offence inmates: What are these men like? *Journal of Gambling Studies, 10*, 237-246.

The Promus Companies. (1996). *The Harrah's survey of casino entertainment. Report of the Promus Companies*. Memphis, TN: Harrah's Marketing Communications.

Thompson, W.N. (1997). *Legalized gambling: A reference handbook*. Santa Barbara, CA: ABC-CLIO.

Toneatto, T., Blitz-Miller, T., Calderwood, K., Dragonetti, R., & Tsanos, A. (1997). Cognitive distortions in heavy gambling. *Journal of Gambling Studies, 13*, 253-266.

Turner, N. (1998). *Provincial survey of gambling and gambling problems*. Unpublished data. Addictions and Mental Health Services Corporation.

United Nations Population Fund. (1993). *The state of the world population*. New York: Author.

Ursua, M.P., & Uribelararrea, L.L. (1998). 20 Questions of Gamblers Anonymous: A psychiatric study with population of Spain. *Journal of Gambling Studies, 14,* 3-15.

Van Hattenberg, H. (1914). Analerotik, angstlust und eigensinn. Inter Z. *Psychoanal, 2,* 244-258.

Victorian Casino and Gaming Authority. (1995). *Report on the findings of survey of community gambling patterns.* Melbourne: Author.

Victorian Casino and Gaming Authority. (1996). *Positive and negative perceptions of gambling.* Melbourne: Author.

Victorian Casino and Gaming Authority. (1997a). *Fourth survey of community gambling patterns.* Melbourne: Author.

Victorian Casino and Gaming Authority. (1997b). *Fifth community gambling patterns survey combined with second positive and negative perceptions of gambling survey*. Melbourne: Author.

Victorian Casino and Gaming Authority. (1997c). *Older people and gambling*. Melbourne: Author.

Victorian Council on Problem Gambling. (1996). *Break Even G-Line advertising campaign.* A marketing and research report prepared for the Department of Human Services.

Volberg, R.A. (1983). *Constraints and commitments in the development of American Botany*, 1880-1920. Ph.D. Dissertation. San Francisco: University of California.

Volberg, R.A. (1992). *Gambling involvement and problem gambling in Montana*. Report to the Montana Department of Corrections and Human Services.

Volberg, R.A. (1994). The prevalence and demographics of pathological gamblers: Implications for public health. *American Journal of Public Health, 84*, 237-241.

Volberg, R.A. (1995). *Gambling and problem gambling in Iowa: A replication survey*. Report to the Iowa Department of Human Services.

Volberg, R.A. (1996a). Prevalence studies of problem gambling in the United States. *Journal of Gambling Studies,12*, 111-128.

Volberg, R.A. (1996b). *Gambling and problem gambling in New York*: *A 10-Year replication survey, 1986 to 1996*. Report to the New York Council on Problem Gambling.

Volberg R.A. (1996c). *Gambling and problem gambling among adolescents in Georgia. Report to the Georgia Department of Human Services.*

Volberg, R.A. (1997a). *Gambling and problem gambling in Mississippi*. Report to the Mississippi Council on Compulsive Gambling. Social Research Report Series 97-1. Social Science Research Center, Mississippi State University.

Volberg, R.A. (1997b). *Gambling and problem gambling in Oregon*. Report to the Oregon Gambling Addiction Treatment Foundation.

Volberg, R.A. (1998a). *Methodological issues in research on problem gambling*. Report to the National Research Council, National Academy of Sciences.

Volberg, R.A. (1998b). *Testimony: Research on problem gambling*. Testimony before the National Gambling Impact Study Commission. Expert Panel on Pathological Gambling, January 22, 1998.

Volberg R.A. (1998c). *Gambling and problem gambling among adolescents in New York. Report to the New York State Council on Problem Gambling.*

Volberg, R.A., & Abbott, M.W. (1994). Lifetime prevalence estimates of pathological gambling in New Zealand. *International Journal of Epidemiology, 23*, 976-983.

Volberg, R.A, & Abbott, M.W. (1997). Gambling and problem gambling among indigenous peoples. *Journal of Substance Use and Misuse, 32*, 1525-1538.

Volberg, R.A., & Banks, S.M. (1994*). A new approach to understanding gambling and problem gambling in the general population*. Paper presented at the Ninth International Conference on Gambling and Risk Taking. Las Vegas, NV.

Volberg, R.A., & Dickerson, M.G. (Eds.) (1996). Special issue on prevalence studies and pathological gambling. *Journal of Gambling Studies, 12*(2).

Volberg, R.A., Dickerson, M.G., Ladouceur, R., & Abbott, M.W. (1996). Prevalence studies and the development of services for problem gamblers and their families. *Journal of Gambling Studies, 12,* 215-231.

Volberg, R.A., Reitzes, D.C, & Boles, J. (1997). *Exploring links between gambling, problem gambling and self-esteem*. *Deviant Behavior*, 18, 312-342.

Volberg, R.A., & Silver, E. (1993). *Gambling and problem gambling in North Dakota*. Report to the North Dakota Department of Human Services, Division of Mental Health.

Volberg, R.A., & Steadman, H.J. (1988a). Refining prevalence estimates of pathological gambling. *American Journal of Psychiatry,* 145, 502-505.

Volberg, R.A., & Steadman, H.J. (1988b). *Minority Gambling Survey*. Report to the New York Office of Mental Health.

Volberg, R.A., & Steadman, H.J. (1992). Accurately depicting pathological gamblers: Policy and treatment implications. *Journal of Gambling Studies*, *8,* 401-412.

Volberg, R.A., & Stuefen, R.M. (1994). *Gambling and problem gambling in South Dakota: A follow up survey.* Report to Citizens Uniting for Gambling Reform.

Volberg, R.A., & Vales, P. (1998). Juegos de azar y el problema de juego en Puerto Rico [*Gambling and Problem Gambling in Puerto Rico*]. Report to the Puerto Rico Department of the Treasury.

Wakefield, J.C. (1997). Diagnosing DSM-IV: Part 1 DSM-IV and the concept of disorder*: Behavior, Research and Therapy.*

Walker, M.B. (1992). *The psychology of gambling*. New York, NY: Permagon.

Walker, M.B. (1998). On defining problem gambling*. The National Association of Gambling Studies Journal, 10* (1), 5-6.

Walker, M.B., & Dickerson, M.G. (1996). The prevalence of problem and pathological gambling: A critical analysis. *Journal of Gambling Studies*, 12, 233-249.

Wallisch, L. (1996). *Gambling in Texas: 1995 surveys of adult and adolescent gambling behavior. Report to the Texas Commission on Alcohol and Drug Abuse.*

Walters, G. (1997). Pathological gambling in a federal prison: Results from the South Oaks Gambling Screen. *Journal of Gambling Studies*, 13, 7-24.

Warson, A. (1998). Tough deal: Ontario provincial government at center of major controversy. *International Gaming and Wagering Business,* 19, 6, 15.

Weimer, W.B. (1977). *Notes on Methodology.* Hillsdale, N.J: Erlbaum.

Wells, J.E., Bushnell, J.A., Hornblow, A.R. Joyce, P.R. & Oakley-Brown, M.A. (1989). Christchurch psychiatric epidemiology study part 1: Methodology and lifetime prevalence for specific disorders. *Australian and New Zealand Journal of Psychiatry, 23*, 215-226.

Wells, J.E., Bushnell, J.A., Joyce, P.R., Oakley-Brown, M.A., & Hornblow, A.R. (1992). Problems with alcohol, drugs and gambling in Christchurch, New Zealand. In M. Abbott & K. Evans (Eds.), *Alcohol and drug dependence and disorders of impulse control*. Auckland: Mental Health Foundation of New Zealand.

Wildman, R.W. (1998). *Gambling: An attempt at an integration*. Edmonton: Wynne Resources.

Williams, E.P. (1969). Planning a rationale for naturalistic research. In E.P. Williams & H.L. Raush (Ed.). *Naturalistic viewpoints in psychological research*. New York: Holt, Rinehart and Winston.

Winters, K.C., Specker, S., & Stinchfield, R. (1997). *Brief manual for use of the Diagnostic Interview for Gambling Severity.* Minneapolis, MN: University of Minnesota Medical School.

Winters, K.C., Stinchfield, R.D., & Kim, L.G. (1995). Monitoring adolescent gambling behavior in Minnesota. *Journal of Gambling Studies, 11*, 165-183.

Wither, A. (1987). *Taking a gamble: A survey of public attitudes towards gambling in New Zealand.* Wellington: Department of Internal Affairs.

Wynn, C.M., & Wiggins, A.W. (1997). *The five biggest ideas in science*. New York: John Wiley and Sons, Inc.

Yaffee, R.A., & Brodsky, V.J. (1997). Recommendations for research and public policy in gambling studies. *Journal of Gambling Studies*, 13, 309-316.

Yeoman, T., & Griffiths, M. (1996). Adolescent machine gambling and crime. *Journal of Adolescence, 19,* 183-188.

Zola, I.K. (1964). Observations on gambling in a lower-class setting. In H.S. Becker (Ed.). *The other side: Perspectives on deviance* (pp247-260). New York: Free Press.

APPENDIX ONE: METHODOLOGICAL ISSUES IN RESEARCH ON PROBLEM GAMBLING [1]

Introduction

In the 1980's following the inclusion of the diagnosis of pathological gambling in the Diagnostic and Statistical Manual (DSM-III) (American Psychiatric Association, 1980) and the rapid expansion of legal gambling in the United States, researchers from a variety of scientific disciplines began to investigate the phenomenon of gambling-related difficulties. The earliest work in this field sought to identify the particular complex of behaviours that characterized 'pathological gambling.' Much of this research was carried out by psychiatrists and psychologists and focused on individuals who had sought help from Gamblers Anonymous or from one of a few professional treatment programs for their gambling-related difficulties (Blackman, Simone, Thomas & Blackman, 1989; Custer, 1984; Greenberg & Rankin, 1982; McCormick, Taber, Krudelbach & Russo, 1987; Moran 1970; Stewart & Brown 1988).

As state and provincial governments began to establish services for individuals with gambling problems, questions arose about the number of 'pathological gamblers' in the general population who might seek help for their gambling difficulties. These questions required epidemiological research to identify the number (or 'cases') of pathological gamblers, ascertain the demographic characteristics of these individuals, and determine the likelihood that they would utilize treatment services if these became available. In the 1990's epidemiological surveys of gambling and problem gambling became an essential component in the monitoring of legal gambling in many countries, including Australia, New Zealand, Canada, and the United States (Volberg & Dickerson, 1996).

In the 1980s, only a few researchers were active in the field of gambling research and there were a limited number of tools available to measure gambling-related difficulties. At the end of the 1990s, there is a rapidly growing community of researchers active in this field and a growing number of tools to measure gambling problems for a variety of purposes. This paper examines the properties and performance of the most commonly used screens developed to assess gambling-related difficulties in clinical and general populations. Given rapid changes in the field of gambling research, researchers will find it helpful to be able to compare the reliability and validity of these instruments as they consider the tools best suited to their various tasks and conceptual frameworks. This paper concludes by addressing questions about the best ways to move the field of gambling research forward.

Screens to Assess Problem/Pathological Gambling

Like all tools used to detect physical and psychological maladies, screens to detect gambling difficulties are expected to make errors in classification. However, misclassification has very different consequences in different settings. For example, clinicians are very concerned with the issue of false positives since this type of error affects their work in diagnosing and treating problem and pathological gamblers. In survey research, false positives and false negatives are important since each classification error has an independent impact on the overall accuracy of an instrument. While nearly all of the screens to detect gambling difficulties work well in clinical settings, where the prevalence of gambling difficulties is predictably high, the performance of most problem gambling screens declines among populations where the prevalence of gambling difficulties is much lower.

The following table shows the different screens that have been developed since the mid-1970s to identify problem and pathological gamblers in clinical or survey research and/or to assess changes in gambling difficulties over time. G.A's '20 Questions' questionnaire predated these screens but was not developed as a research instrument.

[1] An earlier version of this appendix was prepared by R.A Volberg for the United States Research Council.

The first observation that can be made on the basis of this table is that the majority of screens for identifying gambling difficulties were developed during or after 1990. While three screens, including the South Oaks Gambling Screen, were developed before 1990, nine screens for adults and three for adolescents were developed during or after 1990. The second observation that can be made is that the psychometric properties of many of these screens have never been examined although work on several screens, including the DIS, the pathological gambling modification of the Yale-Brown Obsessive Compulsive Scale and the Survey of Individual Reactions, is planned.

Table 1: Screens to Identify Problem Gamblers

Year	Screen	Author	# Items	Development
	Adults			
1974	ISR	Kallick et al	18	Not validated
1984	CCSM	Culleton	28	Not validated
1987	SOGS	Lesieur & Blume	20	Validated w/GA, substance abusers, hospital workers
1990	MOGS	Laundergan et al	12	Not validated
1991	SOGS-R	Abbott & Volberg	20	Validated in NZ general population
1996	DSM-IV Screen	Fisher	10	Not validated, psychometrics examined
1995	DIS	Cunningham-Williams et al	5	Not validated
1996	SGC	Baron et al	?	Not validated, psychometrics examined
1997	DIGS	Winters & Stinchfield	19 or 20	Validated w/tx, helpline, MN population sample
1997	EDJP	Ladouceur et al	?	Not validated
1998	PG-YBOCS	DeCaria et al	10	Not validated
1998	SIR	McGuire et al	135	Not validated
	Adolescents			
1990	SOGS-RA	Winters & Stinchfield	11	Not validated, psychometrics examined
1992	DSM-IV-J	Fisher	10	Not validated, psychometrics examined
1994	MAGS	Shaffer et al	7+12	Not validated, psychometrics examined

What follows is a brief description of each of the screens that have been developed to identify problem and pathological gamblers. This description includes information about the psychometric development of these screens.

Institute for Social Research (ISR)

The first screen used to identify individuals with gambling-related difficulties was developed at the Institute for Social Research for use in the first national survey of gambling in the United States (Kallick, Suits, Dielman & Hybels,[2] 1979). Since this screen was developed before there were any diagnostic criteria for compulsive or pathological gambling, Kallick and her colleagues viewed the problem as one of discriminating pathological gamblers from all other respondents. Eight personality tests were reviewed and 119 items were pre-tested with a sample of known pathological gamblers (members of Gamblers Anonymous) and a sample of Protestant church members. Discriminant function analysis was used to select the 18 variables that classified controls correctly 95% of the time and correctly classified cases 90% of the time.

[2] Pathological gambling was first recognised as a diagnosable disorder in 1980 when it was included in the third edition of the Diagnostic and Statistical Manual (American Psychiatric Association 1980).

These 18 items were then used to identify which persons in the survey appeared to have the same characteristics as compulsive gamblers. A clinical analysis was conducted of the responses of those individuals, "in order to sort out those whose reported betting also indicated a probable gambling problem" (Kallick et al, 1979; p73)

Beyond the pretest, the psychometric properties of the ISR screen were never investigated. Perhaps more importantly, this screen has never been employed to identify individuals with gambling-related difficulties in any other setting.

Cumulative Clinical Signs Method (CCSM)

The Cumulative Clinical Signs Method (CCSM) is based on the Inventory of Gambling Behaviour developed by Custer and his colleagues in the early 1980s (Zimmerman, Meeland & Krug, 1985). While the Inventory of Gambling Behaviour was pre-tested in a case-control study of GA members and a local community service organization (Kiwanis), the researchers viewed their work as exploratory and the Inventory of Gambling Behaviour was never widely used.

The Cumulative Clinical Signs Method is composed of 28 items clustered into five 'tests.' A positive score on any item in a given test constitutes a positive score on that test. The sum of the test scores yields a total score with potential scores that range from zero to five. Respondents are classified as 'potential pathological gamblers' if they score on two of the tests and as 'probable pathological gamblers' if they score on three or more of the tests. An odds ratio method, which expresses the odds in favour of being a pathological gambler for each total score, is used to estimate prevalence on the basis of the results of the CCSM.

While the CCSM was used in two early surveys of gambling and problem gambling in the mid-1980s (Culleton, 1985; Culleton & Lang, 1985), there are several important problems with this screen. These include the lack of experimental validation of the screen as well as questions about the appropriateness of the scoring method developed for the screen (Volberg & Banks, 1990). A separate serious flaw with the use of CCSM in surveys is that respondents are only administered the screen if they identify themselves as gamblers. In Ohio, this approach meant that only 24% of the 800 respondents were asked the CCSM items (Culleton, 1985). If the screen had been administered to all of the respondents who gambled rather than those who identified themselves as gamblers, it is possible that the identified prevalence of pathological gambling would have been much higher.

The South Oaks Gambling Screen (SOGS)

The South Oaks Gambling Screen is a 20-item scale based on the DSM-III diagnostic criteria for pathological gambling and tested against the DSM-III criteria (American Psychiatric Association, 1980; 1987). Weighted items on the South Oaks Gambling Screen include hiding evidence of gambling, spending more time or money gambling than intended, arguing with family members over gambling and borrowing money to gamble or to pay gambling debts.

In developing the South Oaks Gambling Screen, Lesieur and Blume (1987) followed a three-stage procedure. First, an initial list of variables was developed and pre-tested with two groups of inpatient alcohol and substance abusers who were independently diagnosed by a clinician. Second, a revised list of items was pre-tested with two groups of inpatient substance abusers and pathological gamblers. After cross-validation interviews with counselors and spouses, low performance items were culled, the remaining items were subjected to discriminate function analysis, and twenty items were found to discriminate between pathological and non-pathological gamblers. In the final stage, the screen was tested on Gamblers Anonymous members, university students and hospital workers. The test results were checked against scores on the DSM-III-R criteria. The sensitivity of the screen among Gamblers Anonymous members was 99.5 percent while specificity among students and hospital workers was 98.5 percent and 99.3 percent respectively (Lesieur & Blume, 1987).

Until the publication of the DSM-IV (American Psychiatric Association, 1994), the original South Oaks Gambling Screen, along with modified and revised versions of the screen, was the tool most often used to identify individuals with gambling-related difficulties in clinical settings as well as in survey samples (Volberg & Banks, 1990). The original South Oaks Gambling Screen was used in six statewide surveys in the United States between 1986 and 1990 (Volberg, 1994; Volberg & Steadman, 1988). Since 1990, modified or revised versions of the South Oaks Gambling Screen have been used in numerous state and provincial surveys in the United States and Canada as well as in New Zealand, Sweden, Spain and Australia (Abbott & Volberg, 1996; Becoña, 1996; Dickerson, Baron, Hong & Cottrel, 1996; Emerson & Laundergan, 1996; Gullickson & Hartmann, 1997; Ladouceur 1996; Volberg, 1996b; 1997a; 1997b; 1997c; Wallisch, 1996; The WEFA Group, 1997).

Modifications of the South Oaks Gambling Screen

There have been a variety of modifications and revisions of the South Oaks Gambling Screen since the original instrument was published (Lesieur & Blume, 1987). These include changes to the wording of specific items, to the response categories, and to the scoring of the items (Lesieur, 1994). Few of these changes have been examined for their impact on the performance of the South Oaks Gambling Screen.

Surveys of gambling and problem gambling directed by Volberg and her associates since 1991 have used a revised version of the South Oaks Gambling Screen developed in New Zealand (Abbott & Volberg, 1991; 1992; 1996). In revising the South Oaks Gambling Screen, the preliminary unweighted section of the screen was expanded to collect more detailed information about gambling frequency and expenditures. In addition, the weighted items of the screen were expanded to assess both lifetime and current prevalence of problem and probable pathological gambling. To determine if these changes to the South Oaks Gambling Screen had any impact on reported prevalence rates, the revised South Oaks Gambling Screen was tested in Iowa, two years after a baseline survey was completed in 1989 (Volberg, 1994). The difference in the prevalence rates for these two questionnaires in Iowa was 0.1 percent (Volberg & Stuefen, 1991).

Validating the SOGS-R

A two-phase research design in New Zealand made it possible to assess the reliability and validity of the South Oaks Gambling Screen in the general population. Phase One of the New Zealand study was a telephone survey of 4,053 individuals aged 18 and over. Phase Two of the New Zealand study consisted of face-to-face interviews with 217 individuals from Phase One. Four groups were included in the second phase of the study: (1) probable pathological gamblers, (2) problem gamblers, (3) continuous gamblers and (4) non-continuous gamblers. A checklist of the DSM-III-R criteria was used by lay interviewers at the end of each interview to identify respondents as 'true pathological gamblers' (Abbott & Volberg, 1992). These interviewer assessments served as the gold standard against which the revised South Oaks Gambling Screen was measured.

On the basis of this exercise, Abbott and Volberg concluded that the lifetime South Oaks Gambling Screen is very good at detecting pathological gambling among those who currently experience the disorder. However, as expected, the screen identifies at-risk individuals at the expense of generating a substantial number of false positives. The current South Oaks Gambling Screen produces fewer false positives than the lifetime measure but more false negatives and thus provides a weaker screen for identifying pathological gamblers in the clinical sense. However, the greater efficiency of the current South Oaks Gambling Screen makes it a more useful tool for detecting rates of change in the prevalence of problem and probable pathological gambling over time (Abbott & Volberg, 1992;1996).

A recent study in Minnesota supports the New Zealand work on the performance of the South Oaks Gambling Screen (Stinchfield, 1997). In the Minnesota research, the SOGS and a 19-item

version of the Diagnostic Interview for Gambling Severity (DIGS) were administered to three samples, including a general population sample (N=803), a sample of callers to a gambling hotline (N=92) and a sample of individuals entering treatment for a gambling problem (N=152).

As in New Zealand, Stinchfield found that the accuracy of the SOGS was high among individuals who called a gambling hotline or were entertaining treatment but that the instrument did not perform as well in the general population. While Stinchfield concludes that the SOGS has satisfactory reliability and validity in all three samples, he argues that the DIGS is most useful in prevalence surveys of pathological gambling in the general population while the SOGS is best suited for identifying individuals at risk for developing a gambling pathology.

There are some problems with the approach outlined by Stinchfield. These may be due to the fact that the material provided by Stinchfield for this review was incomplete and in draft form. For example, it is not clear in the draft paper provided by Stinchfield whether the information provided on the performance of the South Oaks Gambling Screen is based on the lifetime SOGS items or on items that assessed these behaviours in the past 6 months. Further, it is not clear in the draft paper whether the DSM-IV criteria used to classify respondents were assessed separately or whether responses to the 19-item DIGS questions were used. If the latter approach was used, how were respondents scored in relation to the criteria? Did they only have to acknowledge one of the two questions that assessed most of the criteria or did they have to acknowledge both items in order to meet the criterion? Finally, the reason for assuming that the four individuals in the population sample who scored five or more points on the SOGS were not pathological gamblers is not made clear.

In spite of these questions, Stinchfield's work appears to support our view that the South Oaks Gambling Screen is a useful tool for measuring problem and pathological gambling in clinical and population research. His research further supports our belief that, as new tools emerge for identifying problem and pathological gamblers, work is needed to understand their performance in relation to the South Oaks Gambling Screen.

The Fisher DSM-IV Screen

In developing the DSM-IV criteria in the United States, 222 self-identified pathological gamblers and 104 substance abusers who gambled socially were assessed using a variety of individual items. Discriminant function analysis was used to identify the items that best differentiated between the pathological and non-pathological groups (Lesieur & Rosenthal, 1991).

The DSM-IV criteria were adapted by Sue Fisher for use in a survey of casino patrons in Great Britain (Fisher, 1996). In adapting the DSM-IV criteria for use in population studies, Fisher made some minor adjustments to the wording of the items and used four response categories to add to the psychometric power of the results. In analysing the technical performance of the DSM-IV Screen among British casino patrons, Fisher (1996) found that the screen had good internal consistency as well as factorial, construct and face validity.

The Fisher DSM-IV Screen has been used in three surveys in the United States along with the revised South Oaks Gambling Screen. A less stringent system for scoring the DSM-IV Screen was adopted in the surveys in the United States. In the survey of British casino patrons, Items one through seven were scored if the respondent answered 'Often' while items eight, nine and ten were scored if the respondent gave any positive answer. In the United States surveys, any positive response to the ten items was scored. The scoring system in these surveys was relaxed because of the substantially lower base rate of problem and pathological gambling in the general population compared to the base rate among regular casino gamblers. Analysis shows that the Fisher DSM-IV Screen maintains factorial and construct validity in the United States surveys although the reliability of the screen is somewhat lower than in the British study (Volberg, 1996b; 1997b; 1997c).

Diagnostic Interview Schedule (DIS)

The Diagnostic Interview Schedule (DIS) was developed in the early 1980s as part of the Epidemiological Catchment Area studies in the United States. The DIS is intended to identify a broad range of psychiatric and substance use disorders in the general population and the pathological gambling component was used only in the St. Louis, MO component of the larger ECA studies (Cunningham-Williams, Cottler, Compton & Spitznagel, 1998). The pathological gambling component was also used in telephone surveys in Connecticut and in Edmonton (Bland, Newman, Orn & Stebelsky, 1993; Laventhol & Horwath, 1986).

Although the pathological gambling component of the DIS has changed several times to reflect changes in the diagnostic criteria for the disorder, the screen has never been examined against a known group of pathological gamblers and the psychometric properties of the screen are not known. The Washington University research team has submitted a grant application to the National Institute for Mental Health to conduct such trials. If funded, these trials would begin in mid-1999 (Cunningham-Williams, personal communication).

Diagnostic Interview for Gambling Severity (DIGS)

The Diagnostic Interview for Gambling Severity (DIGS) was developed for use with clients who are being clinically evaluated for gambling problems. The screen is composed of 20 items, two for each of the ten DSM-IV criteria. The DIGS was administered to clients entering two Minnesota outpatient gambling treatment programs (Winters, Specker & Stinchfield, 1997). As we discussed above, a 19-item version of the DIGS was also evaluated against the South Oaks Gambling Screen (Stinchfield, 1997).

The 20-item DIGS was administered to 158 clients entering outpatient gambling treatment programs in Minnesota during 1995-96. The internal consistency of the DIGS for this group was high (r=.92) although the screen performed marginally better with males and with younger individuals. A principal components analysis suggests that the DSM-IV criteria measured by the DIGS are unidimensional across gender and age groups. The DIGS appears to have good convergent and discriminant validity and its developers believe that the scale is an appropriate measure of pathological gambling in a variety of settings.

Other Problem Gambling Screens

A growing number of screens are being developed to identify problem and pathological gamblers in clinical and survey research. The majority of these screens are still in development and little is known about their properties or performance.

The Pathological Gambling modification of the Yale-Brown Obsessive Compulsive Scale (PG-YBOCS) was developed to measure changes in the severity of pathological gambling symptoms over time. The scale is intended for use in treatment settings where a diagnosis has already been made and where the effectiveness of treatment is the dimension of interest. The PG-YBOCS is designed for administration by clinicians and is not suitable for population research purposes. In a single treatment trial, the PG-YBOCS showed good internal consistency (alpha = .825) and good item-to-total consistency. In the same trial, the scale demonstrated good face, content and convergent validity with several other scales including the South Oaks Gambling Screen (DeCaria, Hollander & Begaz et al, 1998). The researchers have applied for funding from the National Institute for Drug Abuse to further develop the PG-YBOCS and test its psychometric properties (DeCaria, personal communication).

Like the PG-YBOCS, the Survey of Individual Reactions (SIR) is an assessment tool intended to help treatment professionals develop and refine treatment plans for individuals already in treatment with a diagnosis of pathological gambling. According to its developers, the SIR is a collection of

135 forced-choice questions aimed at assessing four areas of behaviour related to gambling problems. These include addiction potential, social avoidance, social responsibility and self-alienation. Although a pilot study to refine the inventory of items has been completed with 18 cases, there has not yet been any work to validate the SIR or to test its psychometric properties (McGuire & Spaner, 1998).

Since the early 1990s, several Australian researchers have been working to develop a Scale of Gambling Choices (SGC) to measure impaired control of gambling. Use of the SGC in several Australian state surveys has provided the opportunity to test the psychometric performance of the screen. The developers have found that the scale is composed of four factors with acceptable internal reliability. However, the factors are "difficult to interpret and ambiguous in nature" and the developers have concluded that the scale requires further work before it is widely adopted by the research and clinical communities (Baron, Dickerson & Blaszczynski, 1995).

Like the Australian researchers, there are several research teams in Canada working to develop screens to identify problem and pathological gamblers in the community and to examine issues or more theoretical interest. A research team headed by Robert Ladouceur at the Université Laval in Quebec City is developing the Entrevue de Jeu Pathologique (EDJP) to examine the role of erroneous cognitions in the development of gambling-related problems. Another research team, based in Edmonton, Alberta, is examining the literature on problem gambling screens in preparation for developing a screen specifically for use in community-based surveys.

Finally, there are at least two researcher groups that have developed problem gambling screens specifically for use by family doctors and general practitioners (Pasternak, 1998; Sullivan, Arroll, Coster & Abbott, 1997). These screens are both quite short since they are intended to alert general practitioners and family doctors to the need for referral or intervention for gambling- related difficulties. Although the psychometric properties of these two screens have not yet been examined, it is likely that they will generate a substantial number of false positives.

Adolescent Screens

There has been a remarkable expansion in the number of screens available for identifying pathological gamblers in different clinical settings as well as in survey research and for monitoring change in pathological gambling symptoms over time. While not as remarkable, there has also been growth in the number of screens available for identifying adolescents with gambling-related difficulties. There are three adolescent problem gambling screens that deserve our attention.

The South Oaks Gambling Screen for Adolescents (SOGS-RA)

In the early 1990s in Minnesota, a team of researchers adapted the South Oaks Gambling Screen for use with adolescents (Winters, Stinchfield and Fulkerson, 1993a). In adapting the SOGS items, the researchers modified the borrowing items originally developed for adults. They found that the modified SOGS, known as SOGS-RA (Revised Adolescent) had moderate internal reliability and high content and construct validity among male adolescents (Winters, Stinchfield & Fulkerson, 1993b). Since clinical assessments of adolescent respondents who scored as problem gamblers were not conducted, the criterion or predictive validity of the SOGS-RA could not be determined.

In addition to modifying the specific items of the original SOGS, the Minnesota researchers modified the scoring system for the SOGS. Using an approach adopted from the adolescent substance abuse literature, the Minnesota researchers classified adolescents separately on the basis of gambling frequency and SOGS scores. Low, intermediate and high scores for each dimension were determined by examination of the overall distribution of scores. Finally, groups of non-problem, at-risk and problem gamblers were identified on the basis of their scores on these two dimensions.

In Georgia, New York, Texas and Washington State, the approach used in Minnesota was changed slightly (Volberg 1993; 1996a; 1998b; Wallisch, 1993; 1996). Rather than treating the modified SOGS items as a single dimension, behavioural difficulties and borrowing difficulties were assessed separately. The reason for adopting this more stringent approach to identifying problem gambling among adolescents stemmed from concern about the sensitivity and specificity of the adult SOGS measure with adolescents.

The Massachusetts Gambling Screen (MAGS)

The Massachusetts Gambling Screen (MAGS) was initially developed for use as a brief clinical screening tool although its developers also intended it for use in survey research. In developing the MAGS, researchers administered the screen to the entire student body of an all-male private high school in the Boston area as well as to 856 students at three suburban high schools in the Boston area (Shaffer, 1993; Shaffer, LaBrie, Scanlan & Cummings, 1994). Despite its intended use as a brief clinical screen, the MAGS is typically administered with a 12-item version of the DSM-IV criteria.

Although the MAGS has been adopted for clinical use in several places in the United States, it has only been used in one survey beyond the original developmental work in the Boston area. The seven MAGS items were administered to a sample of adolescents interviewed by telephone in New York State in 1997 (Volberg, 1998b). Two other problem gambling screens, including the SOGS-RA and the DSM-IV adult items, were included in the interview. Psychometric analysis of the three problem gambling screens used in the New York adolescent study showed that the internal consistency of the SOGS-RA and the MAGS was marginal (alpha = .62 and .13 respectively) while the internal consistency of the DSM-IV items was moderate (alpha =.77). The low internal consistency of the MAGS may be due to the small number of items in the screen. While all three screens were found to have good content and congruent validity, correlation coefficients suggest that the SOGS-RA and the DSM-IV tap a more similar dimension than the MAGS (Volberg, 1998b).

The DSM-IV Screen for Juveniles (DSM-IV-J)

In Great Britain, efforts have focused on adapting the DMS-IV criteria for use with adolescents (Fisher, 1992). In a pilot study, a sample of 11- to 16-year-old adolescents from a single secondary school were administered the DSM-IV-J (Juvenile) scale. Involvement in fruit machine play and affirmative answers to four of the 12 items were used to identify respondents as probable pathological gamblers. Those who scored as probable pathological gamblers were significantly more likely than social gamblers to commit large amounts of time and money to gambling, to borrow money and sell their possessions, to skip school and to steal in order to support their involvement in fruit machine gambling.

Since its development, the DSM-IV-J has been used in youth studies in Britain, Spain and Canada (Becoña, 1997; Derevensky & Gupta, 1997; Fisher, 1993; 1995). The screen is closely based on the DSM-IV diagnostic criteria although some changes were made to the last four items to adapt the screen for use with youth populations. In particular, Item ten (Relieving a Desperate Situation) of the criteria was excluded because “young problem gamblers tend to relieve desperate financial situations caused by gambling” by illegal methods enumerated in Item eight of the DSM-IV-J Screen (Fisher 1998; p64).

In a technical report on the performance of the DSM-IV-J in a survey of 9,774 12- to 15-year-old students drawn from 114 schools in England and Wales, Fisher found that the screen performed well. Internal consistency was good for a scale of this size (alpha = .75) and a principal components analysis revealed that the scale was represented by one factor (eigenvalue = 2.99) accounting for 33% of the variance. The DSM-IV-J also demonstrated good construct validity, with highly significant differences in the mean scores of regular and non-regular youth gamblers as well as with respect to behaviours associated with problem gambling (Fisher, 1998).

Moving Forward

Since the turn of the century, there have been three waves or 'generations' of psychiatric epidemiological research. The first generation is comprised of studies carried out before World War II; the second generation is made up of much larger group of studies mostly conducted after World War II in various parts of the world. The third generation of studies began around 1980 and coincided, as did the first two generations, with dramatic changes in psychiatric nomenclature (Dohrenwend, 1998). Like epidemiology in general,

> psychiatric epidemiology… is dependent on the accuracy of diagnostic methods, which in turn, is dependent… on the progress of laboratory and clinical research. In the absence of consensus about how to identify and classify psychiatric disorders, each of the first and second generation studies tended to pioneer its own unique methods and procedures for identifying cases, with very little attention to problems of validity (Dohrenwend, 1998, p.222).

The dramatic change in psychiatric nomenclature represented by the DSM-III, with its systematic approach to psychiatric diagnoses, led directly to the development of semi-structured interviews and rating examinations for use by clinicians. These tools have been quickly adopted for epidemiological research despite the relative lack of research on the validity of these case identification procedures with general population samples (Dohrenwend, 1995). Clearly, the issues faced by gambling researchers and treatment professionals are the same issues faced by all researchers working with psychiatric categories and measures.

In discussing the Diagnostic Interview Schedule, Dohrenwend (1995) notes that a substantial amount of research has been done on the validity of this screen, largely in the form of diagnostic follow-up interviews with patient and general population samples. In considering how the field of psychiatric epidemiology may move forward, Dohrenwend argues for a 'multimethods' strategy (perhaps similar to the 'multiple consistency' approach to Faraone and Tsuang, 1994) where the strengths and weaknesses of several different approaches can be used to complement and cross-check each other. In particular, he argues for a two-stage procedure that "capitalizes on the ability of a psychometric instrument to provide reliable measurement… and on the ability of a clinical examination of provide reliable diagnoses" (p.14).

Like an earlier study in New Zealand, this is the approach now being taken in Sweden, where a sample of 10,000 Swedish residents have been interviewed by telephone and mail with a questionnaire that includes the SOGS-R as well as the Fisher DSM-IV Screen. All of the respondents identified as lifetime problem or probable pathological gamblers on the basis of the SOGS-R Screen will be interviewed again by clinical psychologists along with approximately 100 non-problem gamblers (for a total Phase Two sample of 500) (Rönnberg, Abbott & Volberg, 1998a; 1998b).

Another approach now underway in New Zealand involves a longitudinal study of individuals identified as problem or non-problem gamblers. We have already described the 1991 study of non-problem and problem gamblers in the community that was undertaken in New Zealand (Abbott & Volberg, 1992). In 1998, the same team of researchers re-established contact with approximately 70 percent of the 1992 respondents and the process of re-interviewing these individuals is now underway. This first longitudinal study in the field of gambling research will provide information about the stability of gambling-related problems over a seven year period. It should also provide information about the development of gambling 'careers' and about the role of natural recovery in the management and treatment of gambling difficulties.

While these international studies have tremendous promise, there are limitations to their usefulness since there must always be questions about the applicability of data from one country or culture to another.

The Emergence of a New Gold Standard

In the 1980s, the only tool with demonstrated reliability and validity was the South Oaks Gambling Screen. While the South Oaks Gambling Screen was originally developed for a single, specific use, it was adopted and adapted by researchers and treatment professionals for several different purposes. With limited funding, few researchers or treatment professionals could afford to spend resources to test the performance of the South Oaks Gambling Screen in these new situations. Despite concerns about the performance of the South Oaks Gambling Screen, this tool became and remained the de facto 'gold standard' in the fields of problem gambling treatment and research until 1994 when the new DSM-IV criteria were published (American Psychiatric Association, 1994; Volberg & Banks, 1990).

Most researchers and treatment professionals working in the field of problem and pathological gambling have expressed satisfaction with the new DSM-IV criteria and appear willing to adopt these criteria as the new gold standard. Researchers and treatment professionals in the United States, Canada, Great Britain, Australia, New Zealand, Spain, Sweden, Norway and the Netherlands are ready to adopt the DSM-IV criteria as the new gold standard against which other instruments must be measured. What we need now is research on the reliability and validity of the DSM-IV criteria in non-treatment samples as well as on the performance of the South Oaks Gambling Screen vis-à-vis the DSM-IV criteria and DSM-IV-based screens.

To enable the field of gambling research to move forward in an evolutionary way, it is essential that the performance of any new screen be assessed in relation to existing and accepted measures. The great advantage to using the South Oaks Gambling Screen in population-based research of problem gambling prevalence to date has been the comparability across jurisdictions that comes with this tool (Walker & Dickerson, 1996). The SOGS and SOGS-R have been used in population-based research in nearly 20 states in the U.S., most of the Canadian provinces, Australia, New Zealand, Norway, Sweden, Spain. The internal consistency of the South Oaks Gambling Screen is high across these cultures and even across languages (Abbott, Rönnberg & Volberg, 1997; Volberg & Vales, 1998).

What is new is the rapid expansion in the number of screens available to researchers to identify problem gamblers in different settings along with the different purposes that these screens serve. It is probable that the DSM-IV criteria will emerge as the single agreed-upon gold standard on which different screens or tools for use in clinical settings, in population research, and in evaluating treatment effectiveness are based. However, it is essential to understand that gambling is a heterogeneous set of activities and it may be necessary to develop different screens for male and female gamblers, young gamblers and elderly gamblers; those who prefer different types of gambling and get into difficulties for different reasons. Screens should also be developed to take account of cultural and linguistic differences.

The existence of different screens used for different purposes in the field of gambling research is not necessarily problematic. What is needed are one or more unifying theories about gambling and gambling problems that can be used to guide instrument development. What is also needed is to maintain continuity with earlier work, through examination of the performance of the SOGS against other screens, so that a decade of work may be re-calibrated rather than tossed away. Finally, what is needed is adequate research funding.

Like much of science, measurement is a negotiable process. Instruments are always a reflection of the work that researchers are doing to identify and describe the phenomena in which they are interested (Gerson, 1993; Volberg, 1993). As research on problem gambling continues, our systems for classifying problem gamblers must change. The South Oaks Gambling Screen represents a culturally and historically situated consensus about the nature of problem gambling. As research continues and as the definitions of problem gambling change, new instruments and new methods for estimating prevalence in the general population and for testing models of gambling behaviour

will continue to emerge. These emerging methods must all be tested against each other and against the South Oaks Gambling Screen in order to advance the field of problem gambling research in an orderly manner, ensuring the relevance of our past work as well as our work in the future.

References

Abbott, M.W., & Volberg, R.A. (1991). *Gambling and problem gambling in New Zealand*. Research Series No. 12. Wellington: Department of Internal Affairs.

Abbott, M.W., & Volberg, R.A. (1992*). Frequent gamblers and problem gamblers in New Zealand*. Research Series No. 14. Wellington: Department of Internal Affairs.

Abbott, M.W., & Volberg, R.A. (1996). The New Zealand National Survey of Problem and Pathological Gambling. *Journal of Gambling Studies*, 12 (2), 143-160.

Abbott, M.W., Rönnberg, S., & Volberg, R.A. (1997). *Some major conclusions from the pilot study of gambling and problem gambling in Sweden*. Report to the Sweden Ministry of Health and Social Affairs.

American Psychiatric Association. (1980*). Diagnostic and statistical manual of mental disorders, Third edition*. Washington, DC: Author.

American Psychiatric Association. (1987*.) Diagnostic and statistical manual of mental disorders, Third edition revised*. Washington, DC: Author.

American Psychiatric Association. (1994*). Diagnostic and statistical manual of mental disorders, Fourth edition*. Washington, DC: Author.

Baron, E., Dickerson M.G., & Blaszczynski, A. (1995). The Scale of Gambling Choices: Preliminary development of an instrument to measure impaired control of gambling behaviour. *NAGS '95: Proceedings of the Sixth National Conference on Gambling Studies* (pp 153-167).

Becoña, E. (1996). Prevalence surveys of problem and pathological gambling in Europe: The case of Germany, Holland and Spain. *Journal of Gambling Studies,* 12 (2), 179-192.

Becoña, E. (1997). Pathological gambling in Spanish children and adolescents: An emerging problem. *Psychological Reports*, 81, 275-287.

Blackman, S., Simone R.V., Thomas, D.R., & Blackman, S. (1989). The gamblers treatment clinic of St. Vincent's North Richmond Community Mental Health Center: Characteristics of the clients and outcome of treatment. *The International Journal of the Addictions*, 24, 29-37.

Bland, R. C., Newman, S.C., Orn, H., & Stebelsky, G. (1993). Epidemiology of pathological gambling in Edmonton. *Canadian Journal of Psychiatry*, 38, 108-112.

Culleton, R.P. (1985). *A Survey of pathological gamblers in the State of Ohio*. Report prepared for the Ohio Lottery Commission.

Culleton, R.P., & Lang M.H. (1985). *The prevalence rate of pathological gambling in the Delaware Valley in 1984*. Report to People Acting to Help, Philadelphia, PA.

Cunningham-Williams, R.M., Cottler, L.B., Compton, M.W., & Spitznagel, E.L. (1998). Taking chances: Problem gamblers and mental health disorders: Results from the St. Louis Catchment Area (ECA) Study. *American Journal of Public Health*, 88 (7), 1093-1096.

Custer, R.L. (1984). Profile of the Pathological Gambler. Journal of Clinical Psychiatry, 45, 35-39.

DeCaria, C., Hollander, M.E., Begaz, T., Schmeidler, J., Wong, C.M., Cartwright, C., & Mosovich, S. (1998). *Reliability and validity of a pathological gambling modification of the Yale-Brown Obsessive Compulsive Scale (PG-YBOCS): Preliminary findings*. Paper presented at the12th National Conference on Problem Gambling. Las Vegas, NV.

Derevensky, J. L., & Gupta, R. (1997). *Prevalence estimates of adolescent gambling: A comparison of the SOGS-RA, DSM-IV-J and the G.A. 20 Questions*. Paper presented at the 10th International Conference on Gambling and Risk Taking.

Dickerson, M. G., Baron, E., Hong, S.M., Cottrell, D. (1996). Estimating the extent and degree of gambling-related problems in the Australian population: A national survey, *Journal of Gambling Studies*, 12 (2), 161-178.

Dohrenwend, B. P. (1995). The problem of validity in field studies of psychological disorders, revisited. In M.T.Tsuang, M. Tohen & G.P. Zahner, (Eds.). *Textbook in psychiatric epidemiology* (pp 3-20). New York: Wiley-Liss.

Dohrenwend, B.P. (1998). A psychosocial perspective of the past and future of psychiatric epidemiology. *American Journal of Epidemiology*, 147 (3), 222-231.

Emerson, M. O., & Laundergan, J. C. (1996). Gambling and problem gambling among adult Minnesotans: Changes 1990 to 1994. *Journal of Gambling Studies*, 12 (3), 291-304.

Faraone, S. V., & Tsuang, M. T. (1994). Measuring diagnostic accuracy in the absence of a gold standard. *American Journal of Psychiatry*, 151 (5), 650-657.

Fisher, S. E. (1992). Measuring pathological gambling in children: The case of fruit machines in the U.K. *Journal of Gambling Studies*, 8 (3), 263-285.

Fisher, S. E. (1993). Gambling and pathological gambling in adolescents. *Journal of Gambling Studies*, 9 (3), 277-288.

Fisher, S. E. (1995). The amusement arcade as a social space for adolescents. *Journal of Adolescence*, 18, 71-86.

Fisher, S. E. (1996). *Gambling and problem gambling among casino patrons*. Report to the British Casino Industry Consortium.

Fisher, S. E. (1998*). Gambling and problem gambling among young people in England and Wales*. Report to the Office of the National Lottery.

Gerson, E. M. (1993). Scientific work and social worlds. *Knowledge*, 4, 357-379.

Greenberg, D. & Rankin, H. (1982). Compulsive Gamblers in Treatment. *British Journal of Psychiatry*, 140, 364-366.

Gullickson, A. R., & Hartmann, D.J. (1997). Compulsive Gambling in Michigan: Final report. Report to the Michigan Bureau of State Lottery from the Western Michigan University Evaluation Center and the Leonard C. Kercher Center for Social Research.

Kallick, M., Suits, D., Dielman, T., & Hybels, J. (1979*). A survey of American gambling attitudes and behaviour*. Research Report Series, Survey Research Center, Institute of Social Research. Ann Arbor: University of Michigan Press.

Ladouceur, R. (1996). Prevalence of pathological gamblers in Canada and related issues. *Journal of Gambling Studies*, 12 (2), 129-142.

Laundergan, J C., Shaefer, J. M., Eckhoff, E. F., & Pirie, P. L. (1990*). Adult survey of Minnesota gambling behaviour: A benchmark, 1990*. Report to the Minnesota Department of Human Services, Mental Health Division.

Laventhol & Horwath. (1986*). The effects of legalized gambling on the citizens of the State of Connecticut*. Report to the Connecticut Division of Special Revenue.

Lesieur, H. R. (1984). *The chase: Career of the compulsive gambler*. Cambridge: Schenkman.

Lesieur, H. R. (1994). Epidemiological surveys of pathological gambling: Critique and suggestions for modification. *Journal of Gambling Studies*, 10 (4), 385-398.

Lesieur, H. R., & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the Identification of pathological gamblers. *American Journal of Psychiatry*, 144, 1184-1188.

Lesieur, H. R., & Rosenthal, R. J. (1991). Pathological gambling: A review of the literature (prepared for the American Psychiatric Association Task Force on DSM-IV Committee on Disorders of Impulse Control Not Elsewhere Classified), *Journal of Gambling Studies*, 7, 5-40.

McCormick, R. A., Taber, J., Krudelbach, N., & Russo, A. (1987). Personality profiles of hospitalized pathological gamblers: The California Personality Inventory, *Journal of Clinical Psychology, 43* (5), 521-527.

McGuire, S. R., & Spaner, S. D. (1998). *The Survey of Individual Reactions: Conceptualization and development of a gambling addictions inventory*. Paper presented at the 12th National Conference on Problem Gambling. Las Vegas, NV.

Moran, E. (1970). Clinical and social aspects of risk-taking*, Proceedings of the Royal Society of Medicine*, 63, 1273-1277.

Pasternak, A. (1998). *Prevalence of gambling disorders in a primary care setting*. Paper presented at the 12th National Conference on Problem Gambling. Las Vegas, NV.

Rönnberg, S., Abbott, M. W., Volberg, R. A. (1998a). *Problem gambling in Sweden: Some results from the Swedish Pathological Gambling Prevalence Study*. Paper presented at the 3rd European Conference on Gambling Studies and Policy Issues. Munich, Germany.

Rönnberg, S., Abbott, M. W., Volberg, R. A. (1998b*). Swedish Pathological Gambling Prevalence Study Proposals*. Report No. 1 of the National Institute of Public Health Series on Gambling.

Shaffer, H. J. (1993). *The emergence of youthful addiction: The prevalence of underage lottery use and the impact of gambling*. Technical Report (121393-100). Massachusetts Council on Compulsive Gambling.

Shaffer, H. J., LaBrie, R., Scanlan, K. M., & Cummings, T. N. (1994). Pathological gambling among adolescents: Massachusetts Gambling Screen (MAGS), *Journal of Gambling Studies*, 10 (4), 339-362.

Stewart, R. M., & Brown, R. I. F. (1988). An outcome Study of gamblers anonymous. *British Journal of Psychiatry*, 152, 284-288.

Stinchfield, R. (1997). *Reliability, validity and classification accuracy of the South Oaks Gambling Screen (SOGS*). Paper presented at the 10th International Conference on Gambling and Risk Taking. Montreal, Canada. *(Revised draft received from Stinchfield via e-mail, July 7, 1998)*.

Sullivan, S., Arroll, B., Coster, G., & Abbott, M. W. (1997). Problem gamblers: A challenge for GPs. *New Zealand Family Physician,* 25 (1), 37-42.

Volberg, R. A. (1993*). Gambling and problem gambling among adolescents in Washington State*. Report to the Washington State Lottery.

Volberg, R. A. (1994). The prevalence and demographics of pathological gamblers: Implications for public health. *American Journal of Public Health*, 84 (2), 237-241.

Volberg, R. A. (1996a). *Gambling and problem gambling among adolescents in Georgia*. Report to the Georgia Department of Human Resources.

Volberg, R.A. (1996b*). Gambling and problem gambling in New York: A 10-year replication survey, 1986 to 1996*. Report to the New York Council on Problem Gambling.

Volberg, R. A. (1997a). *Appraisal of problem gambling research in North America*. Report to the Australian Institute for Gambling Research.

Volberg, R. A. (1997b). *Gambling and problem gambling in Colorado*. Report to the Colorado Department of Revenue.

Volberg, R. A. (1997c). *Gambling and problem gambling in Oregon*. Report to the Oregon Gambling Addiction Treatment Foundation.

Volberg, R. A. (1998a) The *evolution of gambling in North America*. Keynote Address, Alberta Lotteries and Gaming Summit. Medicine Hat, Alberta.

Volberg, R. A. (1998b). *Gambling and problem gambling among adolescents in New York*. Report to the New York State Council on Problem Gambling.

Volberg, R. A., & Banks, S. M., (1990). A review of two measures of pathological gambling in the United States, *Journal of Gambling Behaviour*, 6(2), 153-163.

Volberg, R. A., & Dickerson, M. G. (eds.). (1996). *Journal of Gambling Studies*, Special Issue on International Prevalence Studies and Related Treatment Developments. Vol. 12(2).

Volberg, R. A., & Silver, E. (1993*). Gambling and problem gambling in North Dakota*. Report to the North Dakota Department of Human Services, Division of Mental Health.

Volberg, R. A., & Steadman, H. J. (1988). Refining prevalence estimates of pathological gambling, *American Journal of Psychiatry*, 145, 502-505.

Volberg, R. A., & Stuefen, R.M. (1991). *Gambling and problem gambling in South Dakota*. Report to the Governor's Office of South Dakota.

Volberg, R. A., & Vales, P. (1998). *Juegos de azar y el problema de juego en Puerto Rico [Gambling and problem gambling in Puerto Rico]*. Report to the Puerto Rico Department of the Treasury.

Volberg, R. A., & Reitzes, D. C., & Boles, J. (1997). Exploring the links between gambling, problem gambling and self-esteem. *Deviant Behavior*, 18, 321-342.

Walker, M. B., & Dickerson, M. G. (1996). The prevalence of problem and pathological gambling: A critical analysis, *Journal of Gambling Studies,* 12 (2), 233-249.

Wallisch, L. (1993). Gambling in Texas: 1992 Texas survey of adolescent gambling behavior. Report to the Texas Commission on Alcohol and Drug Abuse.

Wallisch, L. (1996*). Gambling in Texas: 1995 surveys of adult and adolescent gambling behavior*. Report to the Texas Commission on Alcohol and Drug Abuse.

The WEFA Group. (1997). *A study concerning the effects of legalized gambling on the citizens of the State of Connecticut*. Report to the State of Connecticut Department of Revenue Services, Division of Special Revenues.

Welte, J. W. (1997). *Co-occurrence of gambling and substance use in the U.S*. Proposal to the Department of Health and Human Services.

Winters, K. C., Stinchfield, R. D., & Fulkerson, J. (1993a). Patterns and characteristics of adolescent gambling. *Journal of Gambling Studies,* 9 (4), 371-386.

Winters, K. C., & Stinchfield, R. D., & Fulkerson, J. (1993b). Toward the development of an adolescent gambling problem severity scale. *Journal of Gambling Studies,* 9 (1), 63-84.

Winters, K. C., Specker, S., & Stinchfield, R. (1997*). Brief manual for use of the Diagnostic Interview for Gambling Severity*. Minneapolis, MN: University of Minnesota Medical School.

Zimmerman, M., Meeland, T., & Krug, S. (1985). Measurement and structure of pathological gambling behaviour. Journal of Personality Assessment, 49, 78-82.