CONFIDENTIAL
REPORT

ASSESSMENT OF THE RESEARCH ON TECHNICAL MODIFICATIONS TO ELECTRONIC GAMING MACHINES IN NSW, AUSTRALIA

FINAL REPORT

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Prepared for: NSW Department of Gaming and Racing
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Acknowledgement

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EXECUTIVE SUMMARY

This report is submitted to the NSW Department of Gaming and Racing and reviews two research Reports produced by the University of Sydney Gambling Research Unit and the Centre for International Economics. The research projects investigated the impact on players and on gaming venue revenue of these proposed modifications to the operation of gaming machines.

The team assembled for the current review primarily come from The Centre for Gambling Studies which is a public good, non-profit research centre established as part of the School of Population Health within the faculty of Medical and Health Sciences at the University of Auckland. No member of the review team has had direct or indirect involvement in the research being reviewed. The review process consisted of an independent review of the two Reports by the three principal reviewers, a literature review of other relevant studies, consultation with experts in health economics and statistical analysis and the conduct of a series of review meetings where the methodology and findings of each study were examined in detail. Interim, mid-way and draft final reports were submitted to the Department of Gaming and Racing as part of this review process.

On the whole, the reviewers conclude that the behavioural research into the impact of modifications on players has greater methodological integrity and draws conclusions that are more consistent with the research findings than the economic study quantifying the gaming revenue at risk.

Based on the review of these two Reports and integrating past research on the topic, the reviewers arrived at the following conclusions:

- The reduction in maximum bet size shows strong potential as a machine-based modification to minimise harm associated with problem gambling;
- The reconfiguration of bill acceptors could be a potentially effective harm minimisation strategy if it was to be implemented together with other considerations such as proximity to ATMs. In isolation, the modification of bill acceptors itself does not appear supported for its effectiveness in harm minimisation; and
- The reel spin modification does not appear, at this stage, to be an effective harm minimisation strategy.

In reviewing the Centre for International Economics Report, the review team had major concerns about the research design from which estimates of the club and hotel revenue at risk were derived. It is reasonable to expect that modifications to gaming machines implemented as part of an effective harm minimisation strategy will impact on revenue. However, the reviewers conclude that the resulting translation into State-wide impacts, such as job losses, was considerably inflated.

In order to maintain impartiality in the review process, the review team relied on the research information presented in the two Reports. The review team has not had any direct contact with the researchers involved in these two Reports.

1 BACKGROUND

1.1 Introduction

Two research projects were commissioned by the Gaming Industry Operators Group to investigate the impact of proposed modifications on players and on gaming venue revenue. The primary purpose of the modifications being considered by the NSW Department of Gaming and Racing and the Liquor Administration Board is to *reduce the harm* associated with gambling on electronic gaming machines.

The two research projects were:
The University of Sydney Gambling Research Unit project was designed to examine the impact on problem and recreational gamblers in respect of:

1. Player satisfaction and enjoyment
2. Player behaviour
3. Player expenditure
4. Problem gamblers' perceptions of the development and severity of their problems

(Blaszczynski, Sharpe & Walker, 2001).

The Centre for International Economics project was designed to quantify the gaming revenue at risk in clubs and hotels through introduction of the modifications and the possible flow on implications for employment and State government revenue (Centre for International Economics, 2001).

1.2 Terms of Reference

The overall aim of this review was to assess the methodological integrity and appropriateness of the conclusions of the two research Reports titled:

> "Final Report: The assessment of the impact of the reconfiguration on electronic gaming machines as harm minimisation strategies for problem gambling" by the University of Sydney Gambling Research Unit (USGRU);
>
> "Gaming machine revenue at risk: The impact of three proposed modifications to gaming machines in NSW" by the Centre for International Economics (CIE).

The specific outcomes for the assessment are:

- The research aims, methodologies, results and conclusions are to be evaluated critically from the standpoint of an expert and professional opinion. The research is not to be evaluated via replication.

- The two research Reports are to be evaluated together as the economic report is dependent on the results from the behavioural research.

- The output for the assessment is to be a report that will give an overall assessment of the reliability and validity of the research reports as well as separate assessments of each section of the reports. Each reliability and validity assessment is to be fully justified with an explanation.

(Abstracted from the Request for Quote, schedule B, p.16)

1.3 Members of the review team

Dr Samson Tse, is the Director for Asian Research, Centre for Gambling Studies, Senior Lecturer in Mental Health Development, Section of Social and Community Health, School of Population Health, at the University of Auckland. Dr Tse worked extensively in helpline services for people with suicidal thoughts and people recovering from drug addiction problems in Hong Kong. After he moved from Hong Kong to New Zealand in 1989, he worked in forensic psychiatry as an occupational therapist and taught in a bachelor programme of occupational therapy. His master's degree is in psychology and he completed his doctoral studies within the Department of Psychological Medicine on the topic of employment and mental health problems. One of his research areas is Asian gambling including prevalence and meaningful diagnosis of gambling, best practice of specialised services for Asians with gambling problems, gambling among overseas Asian students and the impact of gambling on families, especially children.

Dr Robert Brown, is the Director of Policy Studies and Forensic Research, Centre for Gambling Studies at the University of Auckland, deputy Chair of the Problem Gambling Foundation, Chairman of the Gambling Studies Institute, a council member of the Alcoholic Advisory Council. Dr Brown is also an Honorary Research Fellow within the Section of Social and Community Health at the University of Auckland. He has a Diploma in Clinical Psychology and has worked as a clinical psychologist in psychiatric hospitals, prisons and private practice. He completed his Ph.D. in stimulus control of drinking behaviour and established the first educational courses in responsible drinking in New Zealand. He has published some 30 papers in international research journals on alcohol and addiction. He has a Master of Public Policy from Victoria University of Wellington and has provided policy advice to a number of New Zealand Government Departments including the Ministry of Justice, the Department of Justice and the Department for Courts.

Dr Peter Adams, is the Centre Director, Centre for Gambling Studies, at the University of Auckland. He practiced as a clinical psychologist in Auckland for over 13 years, during which time he developed specialist expertise in the area of addictive behaviour. His interest in gambling started in 1995 when he undertook the role of clinical consultant to the Compulsive Gambling Society (now Problem Gambling Foundation of New Zealand, since May 2001). In 1997, he became chairperson of its Board of Directors. More recently, he has focused on developing a range of research projects into problem gambling and in supporting the development of professional education projects. He is currently employed as Head of the Section of Social and Community Health, School of Population Health, Faculty of Medicine and Health Sciences at the University of

Auckland. He co-ordinates addiction teaching within the undergraduate medical programme and has developed a post-graduate programme for specialist addiction workers.

1.4 Review Methodology

Summary of activities are detailed in **APPENDIX A**.

1.4.1 Independent Critique

The three members of the review team have independently read the two Reports in detail. They have compiled notes from their readings to assist with later discussions.

1.4.2 Review Meetings

Regular meetings have occurred involving the three members of the review team where the critiques have been discussed in detail, confirming convergences and negotiating any differences.

1.4.3 Consultations

Consultation with experts in health economics, statistical analysis was sought to provide the review team with additional assistance. The review team also employed a research assistant to conduct a systematic review of literature on the topic- harm minimisation.

Dr Paul Brown is a Senior Lecturer in Health Economics and Acting Director of the Centre for Health Services Research and Policy at the University of Auckland. Dr Brown received his PhD in Economics from the University of Wisconsin. He currently teaches courses in Economic Evaluations, Health Systems and Research Methods at the graduate and undergraduate level and is the Director of Undergraduate Health Sciences. He has been involved in a number of economic evaluation projects, has some 15 academic publications and has worked for the Government's Health Funding Authority. Dr Brown was engaged to provide assistance in interpreting the details on economic impact in the CIE Report.

Mr Alistair Stewart is a Senior Research Fellow in the Section of Epidemiology and Biostatistics in the School of Population Health, Faculty of Medicine and Health Sciences, at the University of Auckland. He has had the role of a consultant statistician in the Auckland Medical School for 23 years providing advice on research design, analysis and interpretation as well as being a member of numerous research teams. He is a steering committee member of a major international epidemiological study in the field of allergic diseases. He has been a co-author on 125 papers published in international peer reviewed journals in a wide range of disciplines in the field of health and medicine. Mr. Stewart was engaged to provide the review team with expert advice on the use of statistical analysis and their subsequent interpretations.

Ms Fiona Rossen is currently a Ph.D. student in the Section of Social and Community Health at the University of Auckland. Ms Rossen was employed as a research assistant in compiling the literature review. Her Ph.D. is investigating the gambling experiences of

adolescents in New Zealand. Of particular interest is the applicability of protective factors and resiliency theory to adolescent gambling behaviour. Ms Rossen has considerable experience in conducting systematic reviews of the scientific literature, and has been employed in this capacity on several projects with both the Problem Gambling Foundation of New Zealand and the Centre for Gambling Studies. She has been employed as a post-graduate tutor and a research assistant in the Section of Social and Community Health. Over the past five years she has worked as a counsellor at the Gambling Problem Helpline, and is currently the coordinator of the Helpline's youth service.

1.4.4 Literature Review

The review team identified a need to compare and contrast research in the two Reports with recent literature on harm minimisation and the effectiveness of electronic gaming machine modifications on gambling behaviour. Fiona Rossen was employed as a research assistant in compiling this review. A number of relevant articles/ studies were identified (e.g., Loba, Stewart, Klein & Blackburn, 2001; Schellinck & Schrans, 2002). The results of the literature review are included in the next section.

2 LITERATURE REVIEW

The purpose of including the literature review as part of the review process was two fold. First, it was to identify relevant studies investigating the effects of modifying electronic gaming machines and principles of harm minimisation in general. Secondly, searching was also conducted on specific issues that emerged during the review process, such as self-selection bias in gambling research.

2.1 Literature Review Methodology

The literature review consisted of three phases, namely on-line database searches, web-based searches and specific website searches. **APPENDIX B** shows the record of literature search and its methodology.

2.2 Relevant studies/ Literature

Four studies were identified as closely relevant to the present review process.

Loba, P., Stewart, S. H., Klein, R. M., & Blackburn, J. R. (2001). Manipulations of the features of standard video lottery terminal (VLT) games: effects in pathological and non-pathological gamblers. *Journal of Gambling Studies. 17*(4), 297-320.

Background

- VLTs are a continuous form of gambling and the short time between wager and payout is thought to be involved in the maintenance of problem gambling.

Research Objectives

- Overall objective was to identify game parameters that would reduce the risk of harm from VLTs by pathological gamblers, while exerting minimal effects on the behaviour of non-pathological gamblers.

Methodology

- Three manipulations of standard VLT game features were explored:
  - A counter which displayed a running total of money spent;
  - A VLT spinning reels game where participants could no longer “stop” the reels by touching the screen; and,
  - Sensory feature manipulations.
- The manipulations were applied to a spinning reels game and a video poker game. This resulted in the following game parameter variations:
  1. Control (standard settings)
  2. Low sensory features (speed of play is slowed; sound is turned off)
  3. High sensory features (speed of play is increased; sound is turned on)
  4. Counter (a running total of $ played is displayed on screen)
  5. Cannot stop reels manipulation (only applicable for the reels game).

- 60 participants were assigned to 1 of 3 experimental groups where they would play four 20 minute versions of a game:
    - Group 1 – spinning reels (slow/no sound; fast/sound; control; counter)
    - Group 2 – spinning reels (slow/no sound; fast/sound; control; cannot stop reels)
    - Group 3 – video poker game (slow/no sound; fast/sound; control; counter)
- In control conditions, participants were exposed to standard settings.
- Participants were given $50 compensation divided evenly over sessions and told to play as little or as much of the money as they wanted.
- A variety of gambling measures were administered.
- After exposure to the various manipulations of the machines, participants completed various self-rating questions (addressing aspects of play such as enjoyment, excitement and tension-reduction).

Key Results

- Findings suggested that the sensory manipulations (i.e., fast speed/sound or slow speed/no sound manipulations) produced the most robust reaction differences.
- Sensory features manipulation (decreasing speed, turning off sound) decreased ratings of enjoyment, excitement and tension reduction for pathological gamblers compared to non-pathological gamblers.
- Pathological gamblers found it more difficult to stop playing than non-pathological gamblers – but only at control settings and fast speed with sound settings.
- Pathological gamblers (but not non-pathological) found it easier to stop gambling when the money counter was displayed relative to when it was not displayed.

Concerns and Limitations

- Manipulations were evaluated in a research setting where participants were not permitted to smoke or drink alcohol and there was no opportunity to interact with other players.
- Participants were aware that the researchers were monitoring their reactions.
- Simultaneous manipulations of speed and sound– hard to determine which factor(s) are producing the observed effects.
- All measures were self-reported.

Relevance to the present review

- Both Loba et al's research and USGRU Report were studying impact of machine-based modifications on players' behaviours.
- Relevant to the USGRU Report except that the Loba et al study was conducted in a laboratory situation and the modifications were different to the USGRU project.
- The study on "decreasing speed" has particular relevance to the present review. However simultaneous manipulations of speed and sound made it hard to determine which factor(s) were producing the observed effects.

Schellinck, T., & Schrans, T. (2002). *Atlantic Lottery Corporation Video Lottery Responsible Gaming Feature Research- Final report.* Atlantic Lottery Corporation and Focal Research.

Background

- In 2000, the Nova Scotia Gaming Corporation announced that they would be replacing Standard VLTs across Nova Scotia with new machines that incorporated 4 Responsible Gaming Features (RGFs).
- The RGFs intended to "assist players in managing the amount of time and money spent while playing the games" and comprised:
    - A permanent on-screen clock denoting time-of-day;
    - A display of betting activity in cash amounts rather than credits;
    - Pop-up reminders of time spent playing after 60, 90 and 120 minutes of continuous play; and,
    - A 5-minute cash out warning at 145 minutes of continuous play and mandatory cash out at 150 minutes.

Research Objectives

- Overall objective was to assess impact of RGFs
    - Assess awareness of and exposure to the features;
    - Determine the effect of the RGFs on player behaviours, perceptions and attitudes; and,
    - Identify what, if any, changes or improvements are recommended to enhance the effectiveness of the features in mediating excessive play.

Methodology

- Qualitative Phase
    - Observation of play on VLTs with RGFs on site
    - Discussion groups (n=22)
        - 4 groups preceded by 1 ½ - 2 hours observed play
            - 2 with non-problem regular VLT players
            - 2 with resolved and current problem gamblers
    - 12 one-on-one interviews
- Quantitative Phase
    - A questionnaire was designed (incorporating information obtained from qualitative section);
    - VLT players were intercepted in-site at 81 locations;
    - 164 regular gamblers were administered the questionnaire to obtain benchmark information;
    - 3 follow-up surveys were administered at approximately 2 month intervals; and
    - Response rate was 69.2% with a drop off rate of 30.8% over the 4 stages of the study.

Key Results

- Exposure to 60-minute pop-up reminder was associated with a small yet significant reduction in session length and a decrease in expenditure among higher risk players;
- Use of the on-screen clock was associated with improvements in keeping track of time and playing within desired time limits;
- Significant decline in average percent of time reported spending more money than wanted;
- Significant decline in session length associated with gambling on new terminals;
- No significant changes in average amount of money spent per session;
- *On a machine basis* (not per player basis) there was *an increase in the rate of expenditure* (amount spent per minute). That suggested higher expenditure on new machines than old machines;
- The findings are *promising* in assessing the potential for machine-based modification in minimising harm associated with excessive video lottery play.
- *Recommendations for changes based on results are made.*

Concerns and Limitations

- The description of the rationale for adopting the selected RGFs is extremely poor. The only reference to the rationale is: "The features were developed after research and consultation with problem gambling experts (Dr Harold Wynne & Dr Howard Schaffer), video lottery manufacturers and player focus groups.
- Use of Canadian Problem Gambling Index (CPGI) to classify gambling status (i.e., not using more internationally standard measure such as SOGS).
- Other modifications to VLTs were introduced simultaneously (e.g., introduction of a note acceptor) making it difficult to separate effects.

Relevance to the present review

- This study is considered to be very relevant to both the USGRU and CIE Report. To our knowledge, the work by Schellinck & Schrans (2002) has been the only published study on modifications of gaming machines *in naturalistic settings* apart from the USGRU and CIE Report.
- It is considered the research methodology employed by Schellinck & Schrans (2002) is a promising approach. That is to identify what the issues might be through focus groups before conducting the full scale use of quantitative measures. The 3 follow-up surveys at approximately 2-month intervals add another desirable feature.

Griffiths, M. D. (1993). Fruit machine gambling: The importance of structural characteristics. *Journal of Gambling Studies, 9*(2), 101-120.

Background

Discussion paper concerned with the structural characteristics of fruit (& other) gambling machines and how these contribute to excessive gambling behaviour. Also examines the history of marketing inducements employed specifically for gambling machines.

Conclusions

Highlights and discusses the importance of the following structural characteristics:

- Payout intervals (time between initial gambling and winning payment) which are linked with
    - Event frequencies (frequency of opportunity to gamble)
    - For EGMs these are dictated by speed of the machine's mechanism, and gamblers themselves;
- The psychology of the near-miss;
- Illusion of control;
- Light and sound effects
    - The names of machines
    - Suspension of judgement (disruption of financial value system – e.g., use of tokens rather than real money).

Recommendations

Suggests that following steps could be taken to decrease the number of people who experience problems with gambling (by aiming to correct cognitive distortions, false beliefs and false expectations):

- Limited use of arousing lighting on the machine;
- Plastic pay out trays rather than metal trays;
- Notices on machines which clearly state the pay out rate, the win probability, and that the machine is on the whole *chance* determined;
- A monitoring device which provides the gambler with a running total of amount of money put into machine (actual rather than turnover);
- Equal numbers of winning symbols on each reel;
- All payouts to be in money rather than tokens;
- Neutral names for machines;
- Less choice in initial gambling stakes.

Relevance to the present review

- Provides the review team with a comprehensive analysis of structural characteristics of electronic gaming machines and their potential impact on players.
- The discussion remains at a theoretical level, with limited empirical support.

Blaszczynski, A. (2001). *Harm minimization strategies in gambling: An overview of international initiatives and interventions*. Australian Gaming Council. Retrieved March 12, 2003, from Web site: http://www.austgamingcouncil.org.au/research/files/International%20Harm%20minimization%20AGC%20draft%20080301.pdf.

Background
Discusses the concept of harm minimisation with regard to gambling. It provides an overview of harm minimisation strategies, adopted and/or implemented by the gaming industry internationally.

States that a wide range of possible harm minimisation initiatives have been recommended internationally. However, these have either not been implemented or implemented on a voluntary basis. Highlights that there is virtually *no empirical evidence* available to inform policy or support their effectiveness.

Body of discussion
Lists recommendations suggested by industry leaders, governments and welfare organisations. The relevant recommendations from secondary prevention include:

- Modifications to player environments designed to protect against excessive play and impulsive decision-making once a gambling session has started e.g., removal of ATMs from gaming areas, cooling off periods after wins;
- Modification of machine design characteristics to limit expenditure: *removal of large denomination bill acceptors and slowing reel spin;*
- Limits placed on total expenditure over specified time-intervals;
- Displays on machines indicating time, duration and expenditure per session.

Also discusses that modifications to electronic gaming machines would involve substantial industry cost and may "be ineffective in achieving objective or may lead to unforeseen negative consequences". One example cited is that slowing the speed of reel spins may cause a problem gambler to remain in a venue for a longer period of time. Briefly discusses Atlantic Lottery Corp's responsible gambling features research.

Brief discussion of structural characteristics and design of machines – continuous nature of gambling encourages excessive gambling. Basically summarises Loba et al's work, and Atlantic Lottery Corp's work.

Concerns and Limitations
No information on how literature was located, searching process, or funding information.

Relevance to the present review

- Provides the review team with a comprehensive review on principles of harm minimisation and its implementation.
- It strongly advocates for further research, "Effective policies and procedures informed by *empirical evidence* rather than opinion or political imperative will only be possible once the results of research projects evaluating initiatives become available" (Blaszczynski, 2001, p. 8).

2.3 Other relevant studies include

Dombrowski, D., Uchtenhagen, A., & Rehm, J. (2001). Casino gambling in Switzerland - The legal situation, politics and prospects for prevention and harm reduction. *eGambling: The Electronic Journal of Gambling Issues*, (4).

Hayward, D., & Kilger, B. (2002). *Breaking a nasty habit: Gaming policy and politics in the state of Victoria*. Institute for Social Research, Swinburne University of Technology. Retrieved March 14, 2002, from www.sisr.net/programcsp/occasionalpapers/interchurch/Gpol2002.PDF

Korn, D. A. (2000). Expansion of gambling in Canada: implications for health and social policy. *Canadian Medical Association Journal, 163*(1), 61-64.

Korn, D. A. (2001). Examining gambling issues from a public health perspective. *eGambling: The Electronic Journal of Gambling Issues*, (4).

Korn, D. A., & Shaffer, H. J. (1999). Gambling and the health of the public: Adopting a public health perspective. *Journal of Gambling Studies, 15*(4), 289-365.

Ladouceur, R., & Gaboury, A. (1988). Effects of limited and unlimited stakes on gambling behavior. *Journal of Gambling Behavior, 4*(2), 119-126.

Shaffer, H. J., & Korn, D. A. (2002). Gambling and related mental disorders: A public health analysis. *Annual Review of Public Health, 23*, 171-212.

2.4 Overall impression

- Overall, the literature cited in the USGRU Report seems to be a reasonable representation of the available literature.
- It is our conclusion that there is a great lack of peer-reviewed and/or empirically based research addressing harm minimisation techniques for gambling. It appears to be a recognised important step for the gambling field to address - but is not yet addressed in any depth.
- Despite the paucity of relevant studies, generally speaking there are consistent findings (e.g., Loba, Stewart, Klein, & Blackburn, 2001; Schellinck & Schrans, 2002) supporting the potential for machine-based modifications to minimise harm associated with problem gambling. Those modifications researched previously were not the same as those studied in the USGRU Report and CIE Report.
- The few pieces of work, which do address harm minimisation for gambling, borrow heavily from the harm minimisation principles identified in the drug and alcohol field. For example, the conceptualisation and strategies of harm minimisation by Marlatt (1998) are often cited.
- The Focal Research report was not available to the researchers at the time of the two Reports currently being critiqued.

3 EVALUATION OF REPORTS

3.1 General Comments

The reviewers wish to congratulate the researchers from the University of Sydney Gambling Research Unit (USGRU) and Centre for International Economics (CIE) in opening up this very important area of investigation into the effectiveness of modifications to gaming machines on harm minimisation, to systematic study. We echo the University of Sydney researchers' reflection in discussing Study 2: Behavioural patterns of play

> "The present study has a number of strengths with regard to design. The study is relatively naturalistic with no attempt to influence the manner in which participants played. It was concluded in actual venues…Patrons attending venues with the explicit purpose of gambling were recruited as participants, and these participants played with their own money. A large sample of participants was recruited into the study" (University of Sydney Gambling Research Unit Report, p. 60).

We also commend the researchers' intent to pursue this line of research in naturalistic settings, which undoubtedly required a high degree of cooperation with a range of organisations.

We appreciate the investigators were under time and budgetary pressure to complete the study and that imposed difficult limitations.

The reviewers were impressed with the extent of detail in the University of Sydney Report, particularly the sophistication of the analysis of harm minimisation in Chapter 5 (pp. 23-42). This clearly demonstrates the researchers' clear understanding of the complexities and issues surrounding the topic.

The reviewers also found the description and analysis of the clubs and hotels in New South Wales in the Centre for International Economics Report Chapter 2 (pp. 3-14) well organised and informative. It has provided the review team with considerable detail on the context in which the present studies were carried out.

The reviewers support the complementary use of qualitative studies to enable finer grain analysis of contributing factors.

3.2 The USGRU Report

Background

The studies used a combination of gaming machine replacement and questionnaire data from individuals in a number of clubs and hotels. The modified machines were placed alongside the standard machines, with players either invited to play the modified machines or in some studies being given no indication that a specific machine had been modified (the "blind" condition). Use of machine and subsequent questionnaire data was used to assess a number of factors, such as the likelihood that players would prefer modified to unmodified machines, players' behaviours, level of enjoyment and satisfaction.

Specific issues include:

3.2.1 Lack of alignment in some findings

Some inconsistencies existed between findings reported in individual studies and the Executive Summary. The review team believes that the inconsistencies may create confusion for readers, policy makers and may lead them to arrive at inappropriate conclusion about the implications for harm minimisation.

Table 1 Lack of alignment in some findings between the Executive Summary and notes included in each study within the USGRU Report

	Summary findings (pp.8-10)	Notes included in Each study
Reducing maximum bet from $10 to $1	• "This modification *appeared* to reduce play. Players gambled for shorter periods, made fewer bets, lost less money and smoked and drank less on such modified machines in comparison to control machines" (p. 10, italic added). • "This study provides preliminary evidence to support the effectiveness of reducing the maximum bet size from $10 to $1 on electronic gaming machines for *at least a small proportion of players*" (p. 10, italic added).	*Inconsistent reporting* between Executive Summary and individual study: "There was *a large effect on* almost all variables of reducing the maximum bet to $1. Players on these machines played for less time, made fewer bets, lost less money and drank and smoked less than the players who played machines with a maximum bet of $10" (p. 64, italic added). "Interpretation of this finding is complicated by the fact that in the study design, participants could choose to move from one machine to another…Nonetheless, coupled with the predictive value of number of credits wagered in other analyses, these findings support the view that reducing the maximum bet to $1 *would be an effective*

		harm minimization strategy with regard to its ability to reduce the impart on vulnerable patrons" (p. 65, italic added). "The interpretation of results of data related to the lowering of the maximum bet size *is clearer*. In practice, lowering the maximum bet size means lowering the number of credits that are staked per line. Evidence from this study *consistently supports the fact that increased bet size is associated with problematic levels of gambling*" (p. 66, italic added). "Although only a few participants in this study bet over the $1 max bet, *the number of credits usually staked was consistently associated with gambling variables*. Credits predicted gambling status, severity of problem gambling and the amount lost within an individual session. *Of the gambling variables, lowering the available credits on the modified machines markedly reduced time spent gambling, number of bets and losses*" (p. 66, italic added). "The results from this study suggest that reducing the max bet size to $1 through reducing the number of credits wagered per line *is likely to be effective* in reducing losses and reducing the severity of gambling particularly for those who are vulnerable" (p. 66, italic added).
Bill acceptors:	• "The present study found *no evidence* supporting the contention that this modification would effectively reduce gambling behaviour amongst problem gamblers" (p. 9, italic added). See *additional comment* on next page. • "Anecdotal data obtained from pathological gamblers participating in the focus group suggested that this proposed modification (*reconfiguration of bill acceptors*) would be unlikely to lead to an alteration in patterns of play" (p. 9, italic added).	*Consistent reporting* between Executive Summary and individual study, except that: "The responses regarding bill acceptors was varied but it appears that for a number of gamblers, it is the *combination of bill acceptors and the close proximity of ATMs* that pose a hazard for controlled gambling" (p. 85, italic added; discussion in the focus group study). "Not all gamblers stated that they used large denomination bill acceptors but a *recurrent theme* was that removing or reconfiguring low denomination bill acceptors *was considered to be a useful harm minimization strategy*" (p. 82, italic added; discussion in the focus group

		study). *Additional comment*: This finding mentioned in the Executive Summary is in conflict to another statement listed in the Executive Summary, "Limiting bill acceptors to $20 denominations affected expenditure more than any other individual modification, reducing take by 42%" (p. 9). If a proposed modification was associated with a reduction in expenditure by up to 42% then it would very likely have impact on players' behaviours including problem gamblers.
Reduction of reel spin speed:	• "Rapid play was not found to contribute to problem gambling status, severity of problems or amount spent" (p. 9) • "…there was little evidence that it would reduce problems associated with gambling" (p. 9) • "…was not found to have any positive or negative impact on observable parameter of play" (p. 9). • "… it may result in an increase in indirect social/ family harm associated with problem gambling for a small proportion of problem gamblers" (p. 9).	*Consistent findings* between Executive Summary and individual study, except minor discrepancies: "Hence, there *was only weak, indirect evidence* that this modification may produce some benefit to a small proportion of problem gamblers" (p. 65, italic added) (Unfortunately reviewers were not able to find further elaboration). Again the Report states, "In conclusion, on the basis of this study, there is very weak evidence to suggest that slowing down the reel spins of electronic gaming machines may help a *small proportion of* problem gamblers, but there is evidence of potential unintended negative consequences, specially that it may simply extend the period of play for a cohort of individuals" (P. 66, italic added).

It is the reviewers' conclusion that the strength of some findings discussed in individual studies (study ONE to FOUR) was weakened and their implications for harm minimisation were dampened in the Executive Summary (USGRU Report, pp. 8-12). If one reads only the Executive Summary may form the opinion that all these three modifications have either minimum or no impact at all for reducing harm associated with excessive gambling.

3.2.2 Inconsistency in defining problem gambling

There is a lack of consistency in defining "problem gambling" (see the inconsistent interpretation of SOGS on pp. 8 & 28 versus pp. 69 & 72).

Table 2 Inconsistency in defining problem gambling

	Early part of the Report (e.g., pp. 8 & 28)	Later part of the Report (e.g., pp 69[1] & 72)
Using South Oaks Gambling Screen (SOGS)	Definition of *problem gamblers*: score 5 or more on the SOGS	• *Problem gamblers*: score 10 or more on the SOGS • Gamblers at risk: score 5-9 on the SOGS • Recreational gamblers: score less than 5 on the SOGS

In study One and Two, "score 5 or more on the SOGS" was used as the criteria to determine problem gamblers. However in study Three which had a specific focus to investigate the variation in expenditure on the modified machines compared with the standard machines, a different or more "stringent" criteria was applied (i.e., score 10 or more on the SOGS). This inconsistency can lead to serious problems of interpretation. For example, the Report declared,

> "At two of the five venues, no participants taking part in this study fell in the problem gambling category" (USGRU Report, p. 73). Also, "Unfortunately, the sample of problem gamblers with SOGS scores of 10 or more was too small to allow this question to be answered directly" (USGRU Report, p. 75).

The review team believed that the sudden change in criteria may lead to major misinterpretation that the proposed modifications did affect expenditure but it was not possible to determine if there was any impact for harm minimisation because the sample size of problem gamblers was not big enough to allow further analysis (see the above quote). However if the earlier criteria was adopted, there might be enough sample size to investigate the possible impact for harm minimisation amongst problem gamblers.

3.2.3 Concern about use of some statistical analysis and interpretation

The overall impression is that in some places, details regarding the use of statistics and their interpretation have been either largely ignored and/or not adequately described. Or sometimes conversely, the results have been over emphasised (e.g., USGRU Report, pp. 71-72).

[1] With regard to definition of problem gambling, the Dickerson et al (1995) reference mentioned on p. 69 of the USGRU Report is not included in the reference list. A search of MEDLINE and PsychINFO (Author = dickerson m or dickerson mark or dickerson mark g) revealed only one reference for 1995 in which Dickerson was not the primary author and which looked at adolescent gambling.

The reviewers would recommend that *only very broad conclusions* be drawn from this part of the work.

Other general concerns include:

- The description of the study design and statistical methods is cursory in some instances.
- On the whole the USGRU Report indicates a suitable analysis but is lacking in detail.
- There are some concerns with the presentation (for details, please see **APPENDIX C**).
- In some instances, there are indications that the statistical analyses may have been misinterpreted.

See **APPENDIX C** for details of reviews on statistical analysis for each study within the USGRU Report.

3.2.4 Unclear recruitment process

- Details on prospective participants' refusals to take part (e.g., USGRU Report, pp. 55-56, 69) were not provided. The researchers state, "Anecdotal observations by research assistants suggest that *a large proportion of those people approached* did not wish to take part" (USGRU Report, p. 61, italic added). It could be that the appearance of research assistants, the language used, and the formality of the approach may have contributed to avoidance, reluctance and refusals by problem gamblers. We acknowledge the researchers' attempt to discuss the issue fairly extensively (see USGRU Report pp. 60-62), but the details on how participants were approached and recruited in those two studies were still lacking.
- The reviewers did not find information on ethnicity of participants. It is highly probable that the engagement process would skew the sample to English-speaking clients of European background. This "skewed" sample is unlikely to adequately represent the ethnic profile of patrons taking part in gambling activities in hotels and clubs. This limitation was acknowledged by the researchers.
- The "convenience" sampling limits the ability to generalise the findings. This limitation was acknowledged by the researchers.
- On the whole, the recruitment process for players and venues was unclear.

3.2.5 Inadequate information on instruments

- The reviewers were unable to find information on development of some survey instruments (e.g., "satisfaction scale", the "enjoyment question", see p. 47). There is no evidence of standardisation, validation and reliability assessment of scales and survey questions. No pilot-testing was reported.
- Design of the "satisfaction scale" was unclear.
- The Reports should include copies of the scales in an appendix.

- On page 46, the report states that FOUR [2]questionnaires were used, but only three are listed. Regarding the CIE questionnaire, it was described as a 14-item questionnaire, but we found 15 items on the questionnaire (see CIE Report, pp. 51-55).

See **APPENDIX D** for more a detailed review of the FOUR USGRU studies.

3.3 The CIE Report

Background
A primary focus of the CIE Report was on the projected revenue loss to the gaming establishments and the State of NSW should the proposed machine modifications be introduced.

Specific issues include:

3.3.1 Questionable projection of revenue at risk

The CIE Report estimates the potential revenue that could be lost from the $10 maximum bet limit being reduced to $1 and the slower machine speed by looking at the revenue lost on a modified machine and then extrapolating from there. Thus, the "revenue at risk" estimate represents the potential revenue loss should all the machines be replaced. This is formed by extrapolating from the individual machine level to the venue level (the venue figures were based upon the number and type of machines that currently operated).

There are three reasons to question whether it is appropriate to extrapolate from the individual machines to the aggregate:

- Substitution to other machines: If only some of the machines are replaced, then people may substitute away from those machines with modifications toward the other machines. Thus, the overall dollars spent on the machines may remain unchanged, but the utilisation rate of unmodified machines may increase. The exact degree of substitution depends upon the ability of consumers to switch to an unrestricted machine. This aspect in fact has been acknowledged and briefly discussed in the USGRU Report (see USGRU Report, p. 65).
- Elasticity with respect to time: As the CIE Report points out, people may extend the time they play (see CIE Report p. xi and also numerous places in the USGRU Report e.g., pp. 9, 64 & 65). The extent to which people increase the time they play the machines will impact on the total revenue lost. It may also have other negative impacts such as additional time away from home or employment (discussed in the USGRU Report, p. 66).

[2] In the interim review report to the Department of Gaming and Racing, the review team requested a copy of questionnaires. The copy was received via fax on 17 April 2003. It had four sets of questionnaires namely, questions comparing satisfaction with the eight machines, impaired control scale, South Oaks Gambling Screen and Jacob's Dissociation Scale. It also included a complete set of focus group prompt questions.

- Players' satisfaction surveys are difficult to determine since we would expect *a priori* that the players would at best be indifferent, but more likely to prefer an unmodified to a modified machine.

Regarding the conclusions about revenue estimates, the revenue at risk projections represent the *absolute maximum amount* that might be lost (CIE Report, p. 24). Unfortunately, it is not possible to estimate from the CIE Report how much will actually be lost. To do so would require a methodology whereby:

- Using various remote and distant locations (but comparable for example, in terms of the socio-economic status and ethnic profile) for experimental and control groups so that essentially, players exposed to an experimental venue could not choose to play at a control venue;
- All venues in a specified location had modified machines introduced; and
- Revenues for each venue are compared with a control.

3.3.2 Questionable projection of impact on tax revenues

Given that the revenue at risk estimates are unreliable, the projected impact on the tax revenues is also questionable.

Furthermore, it must be pointed out that the Report's treatment of direct and indirect effects is limited to the impact on the gaming industry. It does not reflect the net impact of gambling on the State or federal government revenue and expenditure. There are two points to make with regard to the impacts on government.

- Any reduction in revenue from the proposed alterations does not mean *a total loss* of that money to the State. Because gambling is primarily a form of recreation, people will have other uses for the recreational dollar. Revenue from these sources will flow in full or in part to the State, meaning the net lost revenue may be less than projected in the CIE Report. It is acknowledged that gaming machine expenditure is taxed at a much higher level than other forms of recreational activities, that would generally only attract GST.

- The CIE Report does not consider other direct and indirect impacts that gambling (especially problem gambling) may have on the wider community, such as health impacts, productivity losses, other social service expenditures, and financial and social effects on families. Thus, readers should be aware that the CIE Report does not reflect the likely impacts on State and federal governments as these agencies are concerned with the wider impacts on society, not merely the impacts on the gaming industry.

3.3.3 Unreliable questionnaire data

This type of evidence (responses from questionnaires) is not necessarily reliable. It is difficult to identify how the survey was administered (since only incomplete information on the methodology is available to the reviewers), but it is reasonable to assume that

players would be able to identify the point of the questionnaire (attitudes toward using modified gaming machines). As stated above, as long as we assume that the players will tend to prefer the unmodified to the modified machines, then it is not possible to tell whether the players' answers reflected their intentions or whether they were answering strategically. This is a situation where behaviour, not stated intentions, is the only valid basis for determining substitution effects and the elasticity of demand.

3.3.4 Lack of clarity in data sources

On the whole, the methodology employed by the CIE is not clearly explained. The reader is often forced to guess at the methods from details scattered across the Report. There is a lack of clarity in respect of data sources utilised (CIE Report, pp. viii- x):

Venue Loyalty Player Turnover Data

The collection methodology of the turnover revenue survey was unspecified preventing any assessment of how representative the results were of gamblers in these and similar venues, for example:

- The rationale for selection of 29 venues out of 3,268 in NSW is unclear (CIE Report, p. 3 & 15).
- How/why were these 29 selected? Are these representative in size, location or players profile?
- The extent of machine data collected from the 29 venues is unclear. Does it apply to all machines and all players in the venues? Is it a subset of data (e.g., for loyalty card players)?
- What is the likely profile for loyalty card players compared to others?
- The hotel sample appears to be based on only 347 players in 7 venues. How were those players distributed in these 7 venues?

Individual Loyalty Player Data

- Reference was made to use of "Bonuslog" data without clear specification of parameters and/or possible limitations of this data.
- Reference was made to an "independent dataset" supporting the representativeness of player data. Can this "independent dataset" be accessed?

Games Speed Data

- Reference is made to a "separate set of sample data" that recorded observations on the rate at which people played. It is not clear how this information source was derived, nor how the game duration estimate was calculated. Was the game duration calculated for all players or loyalty players?
- How does the CIE estimate of 5.5 seconds game duration relate to the USGRU duration of 3.5 seconds (for unmodified machines)?

Questionnaire Study Data (related to USGRU Study 2)

- The extent of the link between CIE questionnaire data and USGRU studies is unclear.

- Was the fifteen (or fourteen?) item questionnaire referred to in the CIE Report designed by CIE and administered by USGRU researchers?
- The CIE Report contains poor methodological detail, with no piloting or validation details provided for questionnaire items, and the sampling procedure appears ill defined.
- The CIE study appears to be based upon relatively small sample numbers for some measures, e.g., reference is made to 107 participants in 7 hotel venues. How were these sample respondents selected?
- What percentage of those players approached by the researchers refused or failed to complete?
- Was any attempt made during the study to prevent or control for self-selection bias?
- Were there standardised approach and questionnaire instructions for interviewers and participants?
- Were there controls for length of play and order of play on machines by participants?

"Blind" Test-bed Trials (related to USGRU Study 1)

- It is unclear whether this CIE Report was based entirely upon USGRU field work

APPENDIX E includes more detailed reviews of the CIE Report, namely:
Study 1: Modifications and venue revenue at risk;
Study 2: Qualifying estimates of revenue at risk by questionnaire responses; and
Study 3: Qualifying estimates of revenue at risk by "blind trials".

3.4 Link between USGRU and CIE Reports

3.4.1 Conflicting conclusions from the two Reports

Conflicting conclusions were drawn between the two Reports. For example, in respect of the $1 maximum bet:

> The USGRU researchers conclude that reducing the maximum bet size to $1 is likely to reduce revenue, but to a lesser extent than the alternative proposed modifications (USGRU Report, p. 10). They found that relatively few participants bet in amounts greater than $1, (approximately 3.5% of 497 participants). The USGRU researchers reason that, "Overall therefore only a small percentage of players would be affected by this proposed modification". Consequently, "If the data accurately reflect the number of players who do make bets greater than $1, then the impact on revenue is likely *to be small*." (USGRU Report, p. 11, italic added).
>
> In contrast, the CIE authors conclude that, "The proposal to introduce a $1 maximum bet limit (even if unaccompanied by the other two measures) *is likely to put significant revenue at risk in both clubs and hotels*" (CIE Report, p. x, italic added). The authors continue, "The turnover data from existing player behaviour

> suggest that on its own, that measure puts 17 per cent of club machine revenue at risk, on average. The comparable figure for hotels, is 39 per cent" (CIE Report, p. x)

It is concerning that (irrespective of the harm reduction impact of the proposed harm minimisation strategies) the conclusions of the CIE authors with regard to the anticipated impact on revenue of one or more of the three proposed modifications are in such pertinent ways at odds with the findings derived by the University of Sydney researchers. Particularly when two of the CIE data sources, namely the questionnaire study (related to USGRU Study Two) and the "blind trials" (related to USGRU Study One) utilised shared data collected by the University researchers. If all three harm minimisation measures are introduced, the CIE Report suggests that the risk to revenue from all 3 measures combined is likely to be around 21% in clubs and as much as 41% in hotels (CIE Report, p. 24).

3.4.2 Unclear link between the two Reports

The reviewers realise the CIE and USGRU studies were closely related but we are less clear of the exact link between these two studies. For instance, the reviewers are not clear about whether the two studies accessed the same samples. We believe that the extent of such links between the studies and the overlap in data and reporting between the two should be clearly spelled out.

3.5 Summary of findings on the three modifications

On the whole, as stated in the USGRU Report Executive Summary (under "Conclusions and Recommendations"), "This study provides preliminary evidence regarding the effectiveness of three proposed harm minimization strategies" (USGRU Report, p. 11). This section summarises the evidence (or absence of evidence) for each proposed machine-based modification in relation to implications for harm minimisation and economic impacts coupled with reviewers' comments.

3.5.1 Reducing maximum bet from $10 to $1

Table 3 Reducing bet size and its implications

Potential implications for harm minimisation (HM)	Placing the implications for HM in economic perspective	Reviewers' comments
Strong evidence supporting this implication. "There was *a large effect on* almost all variables of reducing the maximum bet to $1. Players on these machines played for less time, made fewer bets, lost less money and drank and smoked less than the players who played machines with a maximum bet of $10" (USGRU Report, p. 64, italic added). "Interpretation of this finding is complicated by the fact that in the study design, participants could choose to move from one machine to another…Nonetheless, coupled with the predictive value of number of credits wagered in other analyses, these findings support the view that reducing the maximum bet to $1 *would be an effective* harm minimization strategy with regard to its ability to reduce the impact on vulnerable patrons" (USGRU Report, p. 65, italic added). "The interpretation of results of data related to the lowering of the maximum bet size *is clearer*. In practice, lowering the maximum bet size means lowering the number of credits that are staked per line. Evidence from this study consistently supports the fact that increased bet size is associated with problematic levels of gambling" (USGRU Report, p. 66, italic added). "Although only a few participants in this study bet over the $1 max bet, *the number of credits usually staked was consistently associated with gambling variables*. Credits predicted gambling status, severity of problem gambling and the amount lost within an individual session. Of the gambling variables, lowering the available credits on the modified	The USGRU researchers stated, "Overall therefore only a small percentage of players would be affected by this proposed modification". Consequently, "If the data accurately reflect the number of players who do make bets greater than $1, then the impact on revenue is likely *to be small*." (USGRU Report, p. 11, italic added). Apparently conflicting statement from CIE Report, "The turnover data from existing player behaviour suggest that on its own, that measure puts 17 per cent of	Regarding the economic impact, the review team feels it's highly problematic to extrapolate from the individual machine level to the venue level in an environment where patrons could choose between modified and unmodified machines. For further details of discussion, please refer to Section 3.3.1 of this report.

machines markedly reduced time spent gambling, number of bets and losses" (USGRU Report, p. 66, italic added). "The results from this study suggest that reducing the max bet size to $1 through reducing the number of credits wagered per line *is likely to be effective* in reducing losses and reducing the severity of gambling particularly for those who are vulnerable" (USGRU Report, p. 66, italic added).	club machine revenue at risk, on average. The comparable figure for hotels, is 39 per cent" (CIE Report, p. x).	

3.5.2 Reconfiguration of bill acceptors

Table 4 Reconfiguration of bill acceptors and its implications

Potential implications for harm minimisation (HM)	Placing the implications for HM in economic perspective	Reviewers' comments
No evidence to support this implication. "Neither the limiting of bill acceptors nor the slowing down of the reel spin to 5 seconds affected the gambling behaviour of the participants in the present study" (USGRU Report, p. 64). **Could be potentially effective harm minimisation strategy if it was implemented together with other considerations** "Not all gamblers stated that they used large denomination bill acceptors but a *recurrent theme* was that removing or reconfiguring low denomination bill acceptors was considered to be useful harm minimization strategy" (USGRU Report, p. 82, italic added). "The responses regarding bill acceptors was varied but it appears that for a number of gamblers, it is the *combination of bill acceptors and the close proximity of ATMs* that pose a hazard for controlled gambling" (USGRU Report, p. 85, italic added).	From the CIE questionnaire survey, "Note acceptor modification was interpreted as having the lowest impact – 2 per cent for clubs and 6 per cent for hotels" on gaming venue revenue at risk (CIE Report, p. xi). A sensitivity analysis in the CIE study combining the effects of "slower game speed and modified note acceptors is likely to raise the expected revenue at risk to 21 per cent in clubs and 41 per cent in hotels, based on current turnover and revenue patterns " (CIE Report, p.xi).	The review team believes that other possible modifications were not given due consideration in respect of their potential for harm minimisation in the Reports, for example, the location of ATMs. The focus group in the USGRU study indicated the importance of relationships between bill acceptors and ATMs, and the interaction effect between bet size and bill acceptors in relation to players' levels of satisfaction as factors that were worthy of investigation. The review team has little confidence in the revenue at risk estimates provided by the CIE Report. For further details of discussion, please refer to Section 3.3.1 of this report.

3.5.3 Reduction of reel spin speed

Table 5 Reduction of reel spin speed and its implications

Potential implications for harm minimisation (HM)	Placing the implications for HM in economic perspective	Reviewers' comments
No evidence to support this implication. Furthermore the study found that unintended negative consequences may result from this modification. "However, since speed of play was inversely associated with persistence, this suggests that slowing down the reel spin may have unintended negative consequences such as increasing the time that players gamble" (USGRU Report, p. 65). "In conclusion, on the basis of this study, there is very weak evidence to suggest that slowing down the reel spins of electronic gaming machines may help a small proportion of problem gamblers, but there is evidence of potential unintended negative consequences, specifically that it may simply extend the period of play for a cohort of individuals" (USGRU Report, P. 66).	The CIE questionnaire approach suggested that "10 per cent of revenue was at risk from slower game speeds (in clubs) ….11 per cent was the comparable figure for hotels" (CIE Report, p xi).	The comment, "…may help a small proportion of problem gamblers" perhaps is good enough evidence as far as harm minimisation is concerned in the same manner that "installing a locked gate around a swimming pool" might only save a small number of children from drowning.

Placing the implications for ALL three proposed modifications in economic perspective, the CIE study suggests that the revenue at risk from the single measure of implementing a $1 maximum bet limitation is likely to be nearer 17 per cent for clubs and more than 30 per cent for hotels,

> "If all three harm minimization measures are introduced, the risk to revenue is likely to be around 20 per cent in clubs and as much as 40 per cent in hotels" (CIE Report, p. xii).

Also, according to the CIE Report,

> "If revenue at risk estimates of this magnitude were translated into actual losses, a worst case scenario involving all three changes could see club and hotel revenue reductions of around $1 billion and short term job losses nationally of around 20,000, with a heavy concentration in NSW" (CIE Report, p. xii).

However, the review team has *little confidence* in the revenue at risk estimates for gaming venues provided by the CIE Report or in the extrapolation to State and national

revenue impact and job losses. For further details of discussion, please refer to Section 3.3.1 of this report.

4 CONCLUSIONS

4.1 Limitations to the Present Review

The reviewers have not participated in any fashion in the design and implementation of the study. In order to maintain this independence, they have not and do not intend to discuss the research with the investigators. Therefore, we are wholly reliant on the details as presented by the researchers in the two Reports.

However, further information was kindly provided by the USGRU and CIE researchers upon specific request by the Department of Gaming and Racing for the purpose of the present review. The following information was provided:

- Full set of questionnaires and prompts/ questions used in the focus group
- The review team found the comments provided by Dr Alex Blaszczynski, Director at the University of Sydney Gambling Research Unit (on behalf of the USGRU and CIE project) very helpful for the present review. The review team raised five questions in the interim report. The questions were:
    1. Confirmation that the data sources for the 'blind' test bed trials referred to in the CIE report are the same as those for Study 2 of the USGRU report.
    2. Clarification of 'turnover' data used in CIE report. For example, is the turnover data in the CIE report based on total turnover per venue or is it restricted to loyalty players in these venues?
    3. Clarification of whether participants in the questionnaire study were were/were not representative of club and hotel players.
    4. Could copies of the questionnaires used in the USGRU study be made available?
    5. Could details of the procedure and question format regarding whether participants recognized machine modifications be made available?

4*.2 Key Findings*

The reviewer commended the researchers in their efforts to address the research issues in naturalistic settings. The reviewers were impressed with the detailed analysis of harm minimisation approaches in the USGRU Report and the analysis of hotels and clubs in NSW in the CIE Report.

For both Reports, the paucity of methodological detail made it difficult for the reviewers to work out how each study was conducted. Insufficient detail was provided on the sampling procedures, survey instruments, statistical analyses and interpretation of findings. The team noted particularly the lack of alignment between findings in the USGRU studies and content of their Executive Summary. Effective use of focus group involving problem gamblers could expand our understanding of issues associated with harm minimisation and environmental interactions. With regard to studies in the CIE Report, the methods adopted did not provide a sufficient evidential base for projected

revenue at risk in respect of both gambling venue and State-wide economic impacts. Furthermore there were conflicting conclusions between the two Reports (such as different descriptions of the impact of changing the maximum bet size).

The reviewers conclude that the behavioural research into the impact of modifications on players has greater methodological integrity and draws conclusions that are more consistent with the research findings than the economic study. In considering the USGRU studies and integrating past research on the topic, the reviewers arrived at the following conclusions:

- The reduction in maximum bet size shows strong potential as a machine-based modification to minimise harm associated with problem gambling;
- The reconfiguration of bill acceptors could be a potentially effective harm minimisation strategy if it was to be implemented together with other considerations such as proximity to ATMs. In isolation, the modification of bill acceptors itself does not appear supported for its effectiveness in harm minimisation; and
- The reel spin modification does not appear, at this stage, to be an effective harm minimisation strategy.

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5 RECOMMENDATIONS

5.1 Preamble

- These two projects were about harm minimisation in relation to gambling. The reviewers acknowledge the importance of these two Reports in addressing the harm associated with gambling and problem gambling in Australasia.

  On the note of harm minimisation, Blaszczynski, (2001[3], italics added) wrote: "The primary objective of harm-minimization is to *reduce the harmful consequences* associated with, or arising from, gambling rather than the total prohibition or complete avoidance of gambling. Harmful consequences *are not limited to pathological or compulsive gamblers but may also affect recreational gamblers on occasions*. As such, harm minimization represents an alternative to abstinence-oriented policies. It focuses on reducing the adverse consequences among all gamblers including those who cannot cease their activity at the present time, and is compatible with an eventual goal of abstention…Specifically, the aim is:
    - *To protect and prevent* individuals from developing gambling problems in the first instance, and
    - To assist existing problem gamblers by
        - Providing *relevant protective measures* against continued loss of control/ excessive gambling.
        - Offering effective treatment/ rehabilitation services"

  Gambling research in harm-minimisation is still very much in its early stage. These Reports represent some of the very few studies in gathering empirical evidence and advancing our understanding of the issues involved in minimising harm, undertaken to date.

- There are some technical problems with the design and implementation of the two projects.

- However the findings and experience obtained from the two projects show *considerable potential* for developing useful approaches directed at minimising future harm caused by excessive gambling.

- These two projects adopted a "naturalistic" approach, which we consider to be a very legitimate investigative approach. At the same time it is important that the projects still had some controlled elements in terms of their experimental nature.

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[3] *Blaszczynski, A (2001). Harm minimization strategies in gambling: An overview of international initiatives and interventions*. Australian Gaming Council. Retrieved March 12, 2003, from Web site: http://www.austgamingcouncil.org.au/research/files/International%20Harm%20minimization%20AGC%20draft%20080301.pdf

- It is recommended that any further proposed modifications to gaming machines be "tested" in a more systematic fashion by independent researchers with sufficient monitoring in place to determine their likely impact on gamblers, prior to their being adopted on a State-wide basis. This applies in particular to any machine modifications or developments introduced by gambling providers or machine manufacturers with a view to increasing the profitability or revenue producing potential of gaming machines.

- These two Reports highlight the need for more systematic and quality-assured harm minimisation research in the medium and long term.

5.2 Implications for Reducing Harm

In order to provide the Department of Racing and Gaming with specific and firm recommendations, the review team used a 7-point scale adapted from the work by the New Zealand Tertiary Education Commission, 2003[4]. A score of "7" denotes high quality research output of world-class level of excellence that makes a significant contribution to future research activities and an impact on professional practice and/or product development. A score of "1" denotes low level of research excellence that has minimum impact on professional practice or little meaningful implications for product development.

[4] Tertiary Education Commission (2003). Unpublished document on *Performance-based Research Fund Quality Evaluation: Annex C- Descriptors and Tie Points*. Wellington: Author. The first author of this review report, ST, is on the national Health Peer-review Panel therefore he is reasonably familiar with this instrument.

Table 6 Descriptive overview of quality of research output

	Point scale 6-7	Scale 4-5	Scale 2-3	Scale 1
Descriptive overview	The research output demonstrates leadership and accomplishment in research exemplified by a platform of world-class research that is both highly original and ranks with the best of its kind. The output would be likely to be characterised, for example, by outputs that represent intellectual advances, or contributions to the formation of new paradigms, or generation of novel conceptual or theoretical analysis and/or theories or important new findings with wider implications. The research output is exemplary in its field and/or at the leading edge and/or highly innovative. It would be expected to demonstrate intellectual rigour, imaginative insight or methodological skill, or could form a primary point of reference to be disseminated widely. The research output would be likely to result in substantial impact or uptake. Such impacts could also include product development, or significant changes in professional, policy, organisational, artistic or research practice.	The work demonstrates a platform of research output at an intermediate level of excellence that has generated new ideas, interpretations or critical findings and makes valuable contribution to existing paradigms and practices. The research output generates new information or ideas and are well researched and technically sound. The research is likely to contribute to further research activities.	The work demonstrates a platform of research output that is based on a justifiable methodology, and makes some contribution to research within the discipline and/or to applied knowledge.	Marginal or no evidence of quality research output

After extensive discussion among members of the review team, the following scores are allocated to the two Reports:

- The USGRU Report (between 4 and 5 out of 7)
- The CIE Report (between 2 and 3 out of 7)

Balancing the technical problems found in these two Reports against the fact that the projects were breaking new ground in the area of harm minimisation research, and taking into account the findings obtained from other relevant studies, the review team recommends the following order of implications for the studies' findings on each aspect of the three proposed modifications.

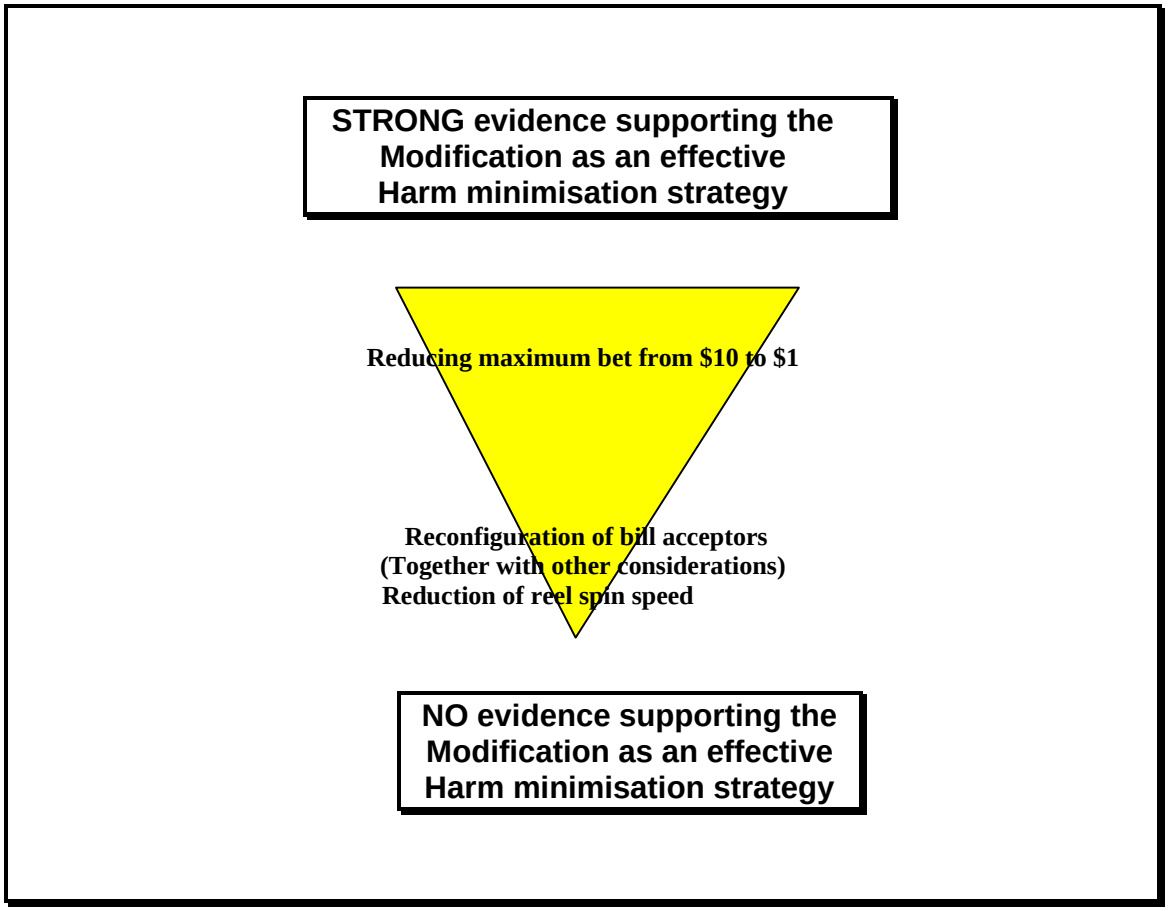

Figure 1 The relative strength of evidence of the three proposed machine-based modifications

Findings emerged from the two Reports yield considerable support for "reducing maximum bet from $10 to $1" as an effective harm minimisation strategy. Therefore the "reducing bet size" modification is placed higher than the other two proposed modifications along the continuum of strength of evidence. Based on focus group data, the "reconfiguration of bill acceptors (together with other considerations)" modification shows potential in minimising harm caused by excessive gambling. Along the continuum, "reconfiguration of bill acceptors" is placed somewhat higher than the "reduction of reel spin speed" because the latter was found to indicate an unintended negative consequence, that is patrons tend to spend more time at the gambling venue.

5.3 Implications for Enjoyment and Satisfaction for Players

It has not been possible to derive any specific conclusions in these areas as these two important psychological constructs - level of enjoyment and satisfaction for players - were measured exclusively by two single items on a previously "unvalidated" questionnaire.

5.4 Implications for Revenue

The review team considers that:

- Work done to date in the CIE study does not give a clear picture of revenue impacts.

- Any reduction in expenditure by problem gamblers is also likely to have broader impacts on community costs as a whole if there is a corresponding reduction in harm experienced by the gambler or his/her family (see USGRU Report p. 66).

- It is not unreasonable to expect that gaming revenue will decrease (at least initially and possibly temporarily) where problem gamblers are encouraged to gamble more responsibly.

- The CIE study reports that club gaming revenues grew by 7.6 per cent per annum between 1995 and 1999 and hotels revenues grew by 41.8 per cent in the same period. More recent data[5] for 2000 to 2002 suggests annual rates of increase have slowed to between 3.5 per cent and 5.5 per cent for clubs and between 7 per cent and 30 per cent for hotels, possibly in part as a result of shorter trading hours. In any case there are continuing increases in gaming machine revenues from both club and hotel venues that over time could *offset any decrease* brought about through implementation of harm minimisation modifications to gaming machines.

- Furthermore, findings from relevant research in Canada (Schellinck & Schrans, 2002)[6], suggest that revenue recovery (per machine) can be expected following an initial decline in revenue consequent upon making machine-based modifications to reduce harm to gamblers.

[5] Upon request, the Department provided the review team with additional data on club and hotel gaming machine profit data (August 1996- November 2002). This information was used only for the present review.

[6] Schellinck, T., & Schrans, T. (2002). *Atlantic Lottery Corporation Video Lottery Responsible Gaming Feature Research- Final report.* Atlantic Lottery Corporation and Focal Research.

5.5 Future Research

Having learnt from the research model used by Schelinck & Schrans (2002), the review team recommends that future research into effectiveness of machine-based modifications as a harm minimisation strategy should consider:

- Using qualitative research to determine the research questions or issues guiding the experimental design and later on, to validate the findings obtained from quantitative measures
- Conducting follow-up studies over 6 to 12 months.

In addition, we strongly recommend:

- Using various remote and distant locations (but comparable for example, in terms of socio-economic status and ethnic profile of gamblers) for experimental and control groups;
- All venues in the experimental location have modified machines introduced; and then
- Valid and systematic measures of the impact of modifications on players' behaviours and revenues for each venue are compared with control venues.

Appendix A: Summary of review activities

Phases	Activities	Status
Phase ONE: Independent expert reviews on the research Reports, findings and methodologies	The key foci for the review in phase one were: • Are the results of the study valid? • Did the research address a clearly focused issue? • Were the research hypotheses stated unequivocally? • Was the method appropriate to the question(s)? • Was the sampling strategy appropriate and clearly explained? • Were all the participants involved in the study properly accounted for at its conclusion? Were the measures employed sufficiently sensitive and specific? • Was the research replicable? • Was the literature review appropriate? • Were ethical issues considered (e.g., ownership/ power; independence of the research?) • Were measures taken to reduce bias? • Were the methods for data analysis appropriate, clearly described and justified? • What can be learnt from the studies? • What are the key findings? • Is there sufficient detail to assess the credibility of the findings? • Will the findings be helpful in making decisions? • Can the findings be applied in a particular setting/ context? • Were all the important outcomes (economic, behavioural and clinical) considered? • What are the areas of uncertainty? • What further research could be undertaken to provide further clarity?	**Completed.** The outcome of *phase ONE* was to identify key issues/concerns, compare similarities or differences across three reviewers and decide on which issues required further investigation, leading to *phase TWO*.

Phase TWO: Team members reconvene to compare independent findings and to agree on in-depth investigation on specific issues identified from *phase ONE*.	This phase involved: • Identifying specific areas of the research that require further investigation that may include, for example, some economic aspects of the modifications, and/or technology surrounding gambling machines. • Conducting comprehensive literature review with a defined scope and clear methodology to provide the review team with updated knowledge on issues identified, specifying: o Database used; o Key words and strategies used for searching; o International and national sources; o Critique of evidence/ literature found in terms of low to high level of importance and credibility. • Inviting Dr Paul Brown (consultant in Health Economic), Ms Fiona Rossen (Research assistant) and Mr Alistair Stewart (Biostatistician) to assist in the investigation.	**Completed.**
Phase THREE: Resolution, Conclusion and Recommendations	• The project team reconvened in a series of working sessions to discuss the findings from *phase TWO*. • Submitted the interim report to the Department by email on 18 March 2003. • Resolved any outstanding concerns. • Noted how a consensus process, if used, is carried out. • Identified any areas of uncertainty or unresolved concerns. • Arrived at conclusions for the reviews. • Submitted draft final report to the Department on 24 April 2003. • Made specific, well-justified recommendations to the Department of Gaming and Racing and submitted the final report on 2 May 2003.	**Completed.** Interim report (18 March, 2003) and final report (2 May, 2003) were completed.

Appendix B: Record of literature search and its methodology

Phase 1: Database Searches

1. A search of the relevant on-line databases (PsychINFO & MEDLINE) available through the University of Auckland was conducted. Details of the search utilised (e.g., search history, keywords, subject headings, and number of results are listed in Tables 1 and 2.

2. Two main areas were searched: gambling related citations (e.g., Table 1 search# 8-14), and harm minimisation citations (e.g., Table 1 search# 1-6). The resulting citations were then combined to give a list of those citations which fulfilled both criteria (i.e., were concerned with gambling **and** harm minimisation.

3. This resulted in extremely small numbers of citations (3 from PsychINFO & 2 from MEDLINE)

4. Through a manual search, it became apparent that the online databases were not fully searchable – i.e., words have to be listed as *key-terms* to provide a positive 'hit'. This made searching for harm minimisation terms via the databases difficult (explaining the extremely small numbers of final hits when combining the harm minimisation searches with the gambling searches).

5. Therefore, all the citations arising from gambling related searches were exported into Endnote[7] to form a 'gambling database':

- 5920 citations were exported from PsychINFO; and,
- 1580 from MEDLINE;
- After preliminary cleaning of the citations a resulting Endnote database of 2847 records remained.

6. Endnote is fully searchable, enabling a more detailed and accurate searching of the references to be conducted (i.e., words did not have to be listed as key-terms to provide a positive 'hit').

7. The Endnote library was then searched with the key terms listed below, resulting references were screened and copies of applicable ones were obtained and reviewed.

Key terms used for searching **Endnote Gambling Database**:

- harm **and** minimization
- harm **and** minimisation
- harm **and** reduction

[7] EndNote is a reference database—it specialises in storing, managing, and searching for bibliographic references in your private reference library.

- reduction **and** strategies
- responsible
- public **and** health
- health **and** promotion
- reels
- reels **and** spin
- reels **and** speed
- event **and** frequency
- maximum **and** bet
- note **and** receptor
- money **and** receptor

It was specified that a term should be in any field and should **contain** the term (i.e., the entire word isn't required – so for example reels will also return reel)

Phase 2: Web-based Searches

The literature search was extended to the World Wide Web in an effort to source unpublished work etc.

1.The initial choice of search engine was Google (www.google.com) – however as Google has a limit of 10 words or less for search queries the Altavista search engine was employed (www.altavista.com).

2.Altavista: Advanced Web Search criteria

- The following Boolean expression/ search query was used as it incorporates the required key terms and their relationships (corresponds with phase 1 of the search).

(gambling OR gamble OR gambler OR gamblers OR gambled OR gaming) AND ("harm minimization" OR "harm minimisation" OR "harm reduction" OR "responsible gambling" OR "responsible gaming") AND (machine OR "electronic gambling machine" OR "electronic gaming machine" OR EGM OR "video lottery terminal" OR VLT OR "pokie machine" OR pokies OR slots OR "slot machine")

- *Search:* Worldwide searching option was enabled;
- *Results in:* Results were limited to the English language;
- *Date:* By timeframe – Anytime
- *File type:* All types
- *Location:* By domain
- *Display:* 10 results per page

3.The search query was run on the 11-03-03 and resulted in 1679 results.

4.Resulting references were screened and copies of applicable ones were obtained and reviewed.

Phase 3: Specific Websites

1. Various gambling specific websites have searchable databases/libraries. Where possible, the websites listed below were searched using the same search terms as specified previously above for the Endnote database. When searching capabilities were not present, a manual browse of the library was conducted.

- The Wager: http://www.thewager.org
- The Electronic Journal of Gambling Issues: http://www.camh.net/egambling/
- Ontario Problem Gambling Research Centre (eWildman[8]): http://www.gamblingresearch.org/
- McGill University Centre for Youth Gambling Problems and High Risk Behaviors: http://www.youthgambling.com/
- Alberta Gaming Research Institute: http://gaming.uleth.ca/index.php
- Responsible Gambling Council (Ontario): http://www.responsiblegambling.org/
- Harvard Medical School – Institute on Pathological Gambling and Related Disorders: http://www.hms.harvard.edu/doa/
- National Centre for Responsible Gaming: http://www.ncrg.org/

[8] eWildman is a review, integration, and citation of close to 8,000 references from within the gambling field. The new version of eWildman includes more than 200 references to articles published in 2001.

Table 1: PsychINFO Search history & results 5th March 2003

Search #	Search History / Keyword (s) / Exact phrase	Mapping of Available Subject Headings	# of results	Combined Results
1	Harm minimization	Treatment Motivation Health Care Policy Theories Organizational Development Organizational Behavior Government Policy Making Harm minimization (keyword)	48	
2	Harm ADJ5 minimization	Harm minimization (keyword)	56	
3	Harm minimisation	Risk Management Social Environments Community Services Behavior Change Dual Diagnosis Addiction Health Care Policy Harm minimisation (keyword)	9	
4	Harm ADJ5 minimisation	Harm minimisation (keyword)	9	
5	Harm reduction	Addiction Prevention Dual Diagnosis Social Behavior Comorbidity Mental Disorders Harm reduction (keyword)	452762	
6	Harm ADJ5 reduction	Harm reduction (keyword)	365	
7				Combined union of 2, 4, 6 using OR: 416 results
8	Gamble money	Gambling Pathological Gambling Gamble money (keyword)	1807	
9	Gambling	Gambling Pathological Gambling Gambling (keyword)	1926	
10	Gaming	Games Gambling Pathological Gambling Gaming (keyword)	5100	
11	Compulsive ADJ5 gamble money	Compulsive gamble money (keyword)	204	
12	Problem ADJ5 gamble money	Problem gamble money (keyword)	298	
13	Pathological ADJ5 gamble money	Pathological gamble money (keyword)	854	
14	Responsible ADJ5 gamble money	Responsible gamble money (keyword)	3	
14				Combined union of 8 – 14 using OR: 5920 results
15	FINAL RESULTS			Combined intersection of 7 and 14 using AND: 3 results

NB: Search queries were not case sensitive;
No limits were set (e.g., language etc);
Date Range = 1966 to February week 3 2003;

All subject headings were exploded when possible to retrieve citations using the selected term and all of its more specific terms

Table 2: MEDLINE Search history & results 5th March 2003

Search #	Search History / Keyword (s) / Exact phrase	Mapping of Available Subject Headings	# of results	Combined Results
1	Harm minimization	Harm Reduction Harm minimization (keyword)	43	
2	Harm ADJ5 minimization	Harm minimization (keyword)	32	
3	Harm minimisation	Risk Assessment Community Mental Health Services Harm minimisation (keyword)	44097	
4	Harm ADJ5 minimisation	Harm minimisation (keyword)	27	
5	Harm reduction	Harm reduction Public Health Health Policy Harm reduction (keyword)	2569096	
6	Harm ADJ5 reduction	Harm reduction (keyword)	387	
7				Combined union of 2, 4, 6 using OR: 441 results
8				Combined union of 1-6 using OR: 2577904 results
9	gamble money	Gambling Gamble$ (keyword)	1357	
10	gambling	Gambling Gambling (keyword)	969	
11	gaming	Gambling Gaming (keyword)	956	
12	Compulsive ADJ5 gamble money	Compulsive gamble money (keyword)	79	
13	Problem ADJ5 gamble money	Problem gamble money (keyword)	125	
14	Pathological ADJ5 gamble money	Pathological gamble money (keyword)	278	
15	Responsible ADJ5 gamble money	Responsible gamble money (keyword)	0	
16				Combined union of 9 – 15 using OR: 1580 results
17	FINAL RESULTS			Combined intersection of 7 and 16 using AND: 2 results

NB: Search queries were not case sensitive;
No limits were set (e.g., language etc);
Date Range = 1966 to February week 3 2003;
All subject headings were exploded when possible to retrieve citations using the selected term and all of its more specific terms

Appendix C: Comments on the statistical analysis and interpretation in the USGRU Report

Study 1: Satisfaction study

- There is no indication of the response rate of participants approached.

- Largely, it would appear that the statistical methods used were suitable, but as very little information as to the distribution of the data is presented there has to be some uncertainty (e.g., USGRU Report, p. 47).

- The description of the study design and statistical methods is extremely cursory hence there is again uncertainty to the appropriateness of the methods (e.g., USGRU Report, pp. 47-51). The researchers acknowledge the repeated nature of the data and report they have done a mixed model analysis - this statement indicates a possible suitable analysis but is severely lacking in detail.

- There are some major concerns with the presentation. Numerous tests of significance are given but very rarely is the effect size reported (e.g., USGRU Report, p. 49). Statistical tests are sample size dependent and so whether a difference is important or not is assessed from the size of the difference.

- There are indications that the statistical analyses may have been *misinterpreted*. The reporting of interactions comes after reference to main effects. Correct interpretation requires that interactions are considered first and, depending on the outcome, a subdivision of the data be implemented before main effects are considered. It is not clear whether this has been done or not (e.g., USGRU Report, p. 47).

- On at least one occasion there is an incorrect interpretation of an interaction. Having found an interaction, in this case between gamblers' status and machine type it is stated that hotel problem gamblers have greater enjoyment ratings and recreational gamblers less satisfaction (sic) with unmodified machine relative to the modified machine (USGRU Report, p. 47). The analysis does not say that, it applies to the relative difference only. There is confusion about the wording of their outcome variable here.

- Given the number of tests of significance that have been performed, these being based on the same group of subjects and on related topics, it is felt that too much importance is being given to P values that are near the traditionally used value that is reported as significant (P= 0.05).

- The first section of analyses under the heading "Club Venues" is poorly presented and may have been poorly analysed (USGRU Report, p. 49). There is a major error in the first table, which very much confuses the issue (machine H is reported as having reel spin of 5 seconds –we suspect it will be 3 seconds; otherwise the

machine H is identical with machine F). The numbers of overlap of individuals is not given – the number of individuals can be gleaned from the degrees of freedom. No effect sizes are given for the first table. The effect sizes for the second table are given in graphical form only and there is an odd feature that the D vs. H comparison appears large in the wrong direction but the test of significance does not show this (USGRU Report, pp. 49-50). Why does machine D not fit the pattern?

- There is an analysis using participants who used all machines but it is not apparent whether these people were included in the analyses above (USGRU Report, p. 49). If they were then, as they would make up over half this group and the results will be rather similar. This gives the impression that there is excessive reanalysis of the same data leading to the reel spin speed looking more important than the data shows.

- There is another section (after Figure 1, USGRU Report, p. 50) describing main effects and then reporting an interaction subsequently – an incorrect sequence.

- In a situation where many highly related analyses have been performed it is important to give a balanced summary. Largely the discussion section does this but even here there is a tendency to over emphasise tests of significance without extreme P values. This section considers each of the modifications separately and indicates that the reel spin speed was the only modification that had any consistency in the analyses (USGRU Report, p. 52).

Study 2: Behavioural study

- Response rate is not given. Anecdotal observation is that it is quite low. This could cause a large bias in the results. Two hotels withdrew from the study, without explanation as to why and what bias this might create.

- This section presents considerably more effect size information than did the previous section. This is highly desirable. Unfortunately this is often reported as mean and standard deviation for highly skewed data.

- The description of the analyses and the ensuing results is very confused. Section 8.6 refers to a 2x2 multiple ANOVA but it is not at all clear what is being referred to here (USGRU Report, p. 56).
    - One of the 2's is modified or unmodified machines but the other factor is not given.
    - A little later, when referring to a sex comparison, the environment (club or hotel) is mentioned
    - Also there is reference to problem and recreational gamblers.

- Under Table 5 in Section 8.6 (USGRU Report, p. 58) there is a paragraph describing an interaction between gamblers' status and gambling site on the

amount of money lost. In this description problem gamblers have a mean loss in hotels of $28.41 and $17.49 in clubs but the table shows problem gamblers have a total loss of $53.60. The weighted average of 28 and 17 is not 53. The same applies to recreational gamblers. This may be an isolated discrepancy but it may be *indicative of problems* that cannot be seen from the presented information.

- Statistics being presented as (e.g., Wald [1,302] = 12.06, p=0.03, see USRGU Report, p. 59) suggest some confusion in presenting what has been produced by the software package. The same applies later (e.g., U[1,170] = -2.920, p=0.03, see USGRU Report, p. 60) when the test statistic is the t-statistic).

Study 3: Expenditure

- The four outcome variables (i.e., "Turnover", "Cash in", "Cash in-cash out", "Take" see USGRU Report p. 67) used are very strongly related to one another. Only one of these variables should be considered. The Report in its current version giving results from them all, and therefore grossly over emphasises the findings.

- There is no indication of the response rate.

- There is no explanation of how missing data was handled (USRGU Report, p. 70). There is no mention of why the missing data problem arose and whether this would cause any bias. One venue had insufficient information and could not be used. There is no explanation for why this occurred and whether this would introduce any bias.

- The study design is a factorial one but the analysis compares each modification combination with the "standard" (USGRU Report, p. 68). It is seen as a very poor analysis.

- "Take" is defined as the total money lost (or won) by players including large wins. Table 8 is on "Take" but a large win is not presented in the table – a contradiction in definition (USGRU Report, p. 71). Also analyses that do not account for all moneys are inappropriate. The nature of gambling is that wins occur rarely – it is most inappropriate to ignore them.

- In section 9.10 there is the statement that there is a drop of 48% in "Cash in-Cash out" and this is greater than 34% in the drop in "Cash in" (USGRU Report, p. 72). As the only difference in these measures is created by the random nature of the machine either this is a chance occurrence or the random nature of the machines was altered by the modifications. (There is no indication on how this analysis was done.) It appears as though this analysis was done with four venues considered in one variable and only three in the other – an erroneous analysis.

- Section 9.12 describes time on the machines and is dismissed as showing no difference without mention of any analysis or P value. There are superficially

quite large differences but no measures of error are given for the reader to make a sensible assessment (USGRU Report, p. 73).

- Section 9.13, as in the previous section does not give any measure of variability.

Study 4: Focus group study

- This part of the study did not involve any quantitative measure therefore no comment on the statistical analysis and interpretation was made.

Appendix D: Review of the FOUR USGRU studies

Study 1: Satisfaction study

Questions addressed

- Whether modifications were detectable and/or affected reported "enjoyment" and "satisfaction" in playing machines.
- Whether recreational gamblers responded differently from problem gamblers in their level of satisfaction playing modified as compared to unmodified machines.

Findings (p. 47)

1. Most participants (75%) were unable to recognise any modification present (although 23% expressed a preference for the unmodified machine).

2. Reducing the maximum bet to $1 affected participants' enjoyment and satisfaction in some circumstances, so that, for example problem gamblers in hotels preferred machines limited to $1 maximum bet, whereas recreational gamblers preferred $10 machines. In contrast gamblers in clubs reported greater enjoyment from $10 machines but reported no difference in satisfaction from $1 and $10 machines.

3. There was little effect on satisfaction or enjoyment of limiting the bill acceptors alone. Modification of bill acceptors by itself did not affect enjoyment or satisfaction across all participants. However there was an interaction effect between bill acceptor and maximum bet. Interestingly, ratings of satisfaction were higher for machines where $10 maximum bets were accompanied by high denomination bill acceptors, or for $1 maximum bet machines with modified (low) denomination bill acceptors.

4. Slower reel spin resulted in a "small, but consistent" (non-significant) tendency to report lower enjoyment and lower satisfaction. Both problem gamblers and recreational gamblers preferred the unmodified machines.

Limitations (some of these also apply to CIE study which reports questionnaire data)

1. Small sample size (175-188 participants).
2. Non-representative venues selected on basis of willingness to participate and use of Turbo system.
3. Non-representativeness of participants with possible recruitment bias (research assistant observations in study 2 suggest "a large proportion of those approached did not wish to take part") possibly resulting, for example, in sampling bias against "regular" gamblers, problem gamblers and non-Euro-Australian gamblers.
4. Different procedures in clubs where participants were required to play 7 modified machines and hotels where participants played one modified machine may have contributed to different outcomes.
5. Missing questionnaire with only 3 out of 4 questionnaires described.
6. Unclear whether the CIE questionnaire contained 14 or 15 items.

7. Possible over- or under-estimation of problem gamblers through use of SOGS.
8. No evidence of piloting, pre-testing or normative data for questionnaires other than SOGS.
9. Possible observer "demand" effect on participant behaviour that may have resulted in "conservative" play with under-representation of larger bets, higher speed and use of larger denomination bills.
10. Difficulties in extrapolating findings from research environment that allows for choice between modified and unmodified machines to proposed no-choice setting.

Conclusion

1. Little evidence that modified bill acceptors would impact either positively or negatively on gamblers' enjoyment of satisfaction.
2. Slowing reel spin speed resulted in lower levels of enjoyment and satisfaction being reported by gamblers.
3. Reducing bets to $1 maximum was positive for problem gamblers in hotels but negative for recreational gamblers while club gamblers (mainly recreational) also preferred $10 max machines (for enjoyment but not satisfaction).
4. Modified machines that limited bets but accepted high denomination bills or conversely permitted large bets but accepted only small denomination bills were least satisfying for players.

Reviewers' Comment
Useful findings on players' enjoyment and satisfaction that may not be representative for all players or indicative of effectiveness of proposed modifications in reducing harm.

Study 2: Behavioural study

Questions addressed

- Whether design changes affect behavioural pattern of players and whether these changes differentially affect problem gamblers.

Findings

1. Only between 3.5% and 12.8% of participants (were observed to) use each of the three features that were modified.
2. Those playing machines with the usual $10 limit played longer, placed more bets, lost more money, smoked and drank more. Conversely those playing the $1 maximum bet machine played for less time, made fewer bets and lost less money.
3. No significant differences were detected in time spent, number of bets, money lost, credits staked or lines played, alcohol or cigarette consumption, or ATM visits from slower reel spin or removal of high denomination bill acceptors in this study.

Strengths
Naturalistic in real life gambling venue settings.

Limitations

1. Small sample sizes- from 8 to 30 participants playing particular (modified) machines.
2. Small sample sizes did not permit assessment of differential behaviour impact on problem gamblers and recreational players.
3. Small sample sizes did not permit assessment of interaction effects among the three modifications.
4. Non-representative venues selected on basis of willingness to participate and use of Turbo system .
5. Non-representativeness of participants with possible recruitment bias (research assistant observations suggest "a large proportion of those approached did not wish to take part") possibly resulting, for example, in sampling bias against "regular" gamblers, problem gamblers and non-Euro-Australian gamblers.
6. Possible observer "demand" effect on participant behaviour, that may result in "conservative" play with under-representation of larger bets, higher speed and use of larger denomination bills.
7. Possible over- or under-estimation of problem gamblers through use of SOGS.
8. Difficulties in extrapolating findings from research environment that allows for choice between modified and unmodified machines to proposed no-choice setting.

Conclusion

1. These findings support the view that reducing the maximum bet size to $1 would be an effective harm minimisation strategy with regard to its ability to reduce the impact on vulnerable patrons (P. 65, para 1), reducing time spent gambling, number of bets and losses. Players on the $1 maximum bet machines played for less time, made fewer bets, lost less money and drank and smoked less than players who played machines with the $10 maximum bet.
2. The researchers point out that their results suggest that from the perspective of the problem gambler, reducing the maximum bet size would produce the intended benefits with no evidence of unintended negative consequences.
3. Reconfiguring bill acceptors provided little evidence that this would affect gambling behaviour.
4. There is only very weak evidence to suggest slowing reel spin speed may help a small proportion of problem gamblers, conversely it may have unintended negative consequences of extending the period of play for some gamblers.

Reviewers' Comment
In the reviewers opinion this behavioural study is the most relevant research reported with findings indicating that the proposed modifications, and in particular reducing the maximum bet size to $1 has the potential to change player behaviour and reduce harm with players spending less time and money playing.

Study 3: Expenditure

Questions addressed

- Whether expenditure and time spent differs on modified and unmodified machines.

Findings

1. Overall the volume of money entered into (Pirates) machines (i.e., "Cash in") dropped by 35% when the machines were modified.
2. There were corresponding drops in money lost by gamblers and "Take" (profit) of machines.
3. Each of the modifications alone or in combination has a similar negative effect (on players' preferences) as measured by "Cash in".
4. No evidence that problem gamblers (5+ score on SOGS) spent less time playing modified machines. (p. 73)
5. The table 12 (p. 73) time measures suggest that players (including both recreational and problem gamblers) in a choice situation tended to spend more time playing the modified than the unmodified machines.

Limitations (some of these also apply to CIE study which reports turnover data from this research)

1. Additional self-selection bias for time spent playing data and SOGS – appears only Bonuslog participants who gave permission for their play to be tracked as part of this study were included.
2. Conducted under conditions of choice, so expenditure and time spent not necessarily representative of no-choice situation where all machines are modified.
3. Choice may be affected by players' perception that $1 max bet machines were defective because some buttons inoperable or inability to play a modified bill acceptor machine with a high denomination note.
4. "Cash out" and "Take" data excluded from data analysis on grounds that some cash out meters did not record correctly (p. 69).
5. Need to estimate unspecified volume of missing data.
6. Data from one out of 5 venues unusable (was this the hotels?), only 3 venues reported on in several analyses.
7. Small sample size is not a limitation here as n =540. However problem gambling rating based on SOGS appears to have changed to 10+ so only 18 problem gamblers included, as opposed to 104 if SOGS score of 5 used.
8. The resulting sample of 18 problem gamblers (SOGS scores of 10+) was too small to determine whether problem gamblers avoid modified machines in a choice situation more than recreational gamblers. However,
    - Those scoring 5+ tended to spend less time playing standard machines than modified machines (Table 12 on p. 73 shows 108 versus 564 minutes).
    - The researchers report that the 18 problem gamblers scoring 10+ "did, however, avoid playing "Pirates" machines *altogether* during the week in which they were placed side by side (P. 75). So again, it is difficult to draw

conclusions about whether those scoring 10+ were less likely or more likely to play modified machines than those with lower SOGS scores.
    - Perhaps the avoidance of standard and modified "Pirates" machines suggests these problem gamblers did not wish to take part in "observed" studies.
9. The researchers report that "players on the whole prefer the standard "Pirates" machines to the modified one"- is confusing. This appears to conflict with the material in Table 12, which shows total playing times for those with SOGS scores of 0 to 5+ of 1,354 minutes on Standard "Pirates" and 1,700 minutes on Modified "Pirates" machines.
10. Researchers do state on p. 73 that, "The data in table 12 provides no evidence that problem gamblers avoided modified machines more than did non-problem gamblers".

Conclusion

1. High SOGS score player spent longer playing machines. The implication is that an effective harm minimisation strategy will reduce time and money spent playing.

Reviewers' Comment

The findings from this study suggest that the modifications are effective in reducing the money spent playing machines. The findings on time spent playing modified machines are less clear.

Study 4: Focus group of problem gamblers

Questions addressed

- The views of gamblers add an important dimension to understanding the complexity and interactions that occur between factors in the environment and the beliefs and social norms that gamblers access.

Findings

1. There was no consistent view expressed on the ability of slowing reel spins in assisting (other) problem gamblers reduce losses.
2. There was general agreement that slowing the reel spin would have a negligible impact on level of enjoyment.
3. If all machines were similarly modified, gamblers would not notice the difference.
4. Generally contended that reducing reel spin speed would not produce any negative effects for recreational gamblers.
5. It was considered that removing or reconfiguring bill acceptors (so that only coins were accepted) was a useful harm minimisation strategy. Through:
    a) Reducing the ease of using large denomination notes (without realising true extent of expenditure), and,
    b) Reducing ability to avoid being recognized as a problem gambler by frequent trips to cashier.

6. Reducing bill acceptors to $20 was not considered likely to have any major harm reduction effect on problem gamblers.

Conclusion

Problem gamblers considered that:

1. Reducing the reel spin speed would have a minimal impact on problem gamblers-players would adjust and might remain longer in the venue to lose the same amount of money.
2. The combination of bill acceptors and ATMs pose a hazard for gamblers.
3. The likely impact of reducing maximum bets size to $1 was determined by interaction of factors like intended duration of players' session.
4. Other machine features such as "near misses", "free spins" and accessibility of ATMs were considered to be factors that could be addressed together with reducing bet size and limiting bill acceptors to low denomination notes in reducing harm.

Reviewers' comments

Confusing message

The introduction refers to the data derived as "subjective in nature" and consequently "should not be interpreted as being as robust as the empirical data obtained from the experimental studies" (p. 77). These statements convey confusion regarding the nature of this type of research. In a qualitative paradigm the subjective and interpretive nature of the research is seen as integral to the whole process, and what allows the analyst to access the meanings and interpretations of the participants. The comments appear to dismiss the value of this form of research, relegating it almost to an afterthought to the whole project.

Recruitment

Recruitment of participants was described as occurring through newspaper advertisements and counseling services. Content of the advertisement was not provided or described, so it is unclear who the recruitment was aimed at and for what purpose. For example, the report does not clearly specify whether experienced EGM gamblers or pathological gamblers are being sought. One question prompt focuses on the experience of problem gamblers, which implies problem gamblers were a target. Later the report describes soliciting "views from people who were actively in treatment and from those who had either successfully or unsuccessfully completed a course of treatment in the past" (p. 80). The Executive Summary describes participants as "self-identified problem gamblers". Yet, by advertising in a local paper a range of different people might reply, and it is unclear whether all respondents were included or whether only problem gamblers were included. If non-problem gamblers were excluded, the process for exclusion is not specified. The study should identify the numbers of participants both included and excluded from each source and from how many services.

Interview Format
The prompt questions used during the interviews/groups were specified under seven main categories of question. The process used to devise these prompt questions was not specified. The questions appear to move between asking participants to describe behaviour and asking them to present their viewpoints. Ideally, the suitability of question prompts should be trialed in a couple of pilot interviews in order to ascertain their suitability and acceptability.

Interview Procedure
Details of the interview procedure are unclear. Earlier in a summary the report states the study employs "focus group methodology" (p. 22). In the introduction to the study it describes, "interviewing pathological gamblers individually and in focus groups" (p. 77). This suggests that both focus groups and individual interviews were used, but it does not specify how many participants were interviewed individually and how many participated in focus groups. Furthermore, the number of focus groups conducted is not specified, which leaves in doubt how broadly viewpoints were canvassed.

The approach taken to interviewing was not specified. Did the focus group facilitators and interviewers aim for passive neutrality in the interviews or were they more active in amplifying ambiguity and inconsistencies. Both approaches are useful depending on the goals of the study. Furthermore, it is unclear what the interviewers brought to the interviews; were they experienced at interviewing and were they the same people who provided the analysis?

The recording and transcribing procedure was not identified. It is assumed that the interviews are at least audio-taped then transcribed, but the degree of detail is unclear. How faithfully were the transcriptions transcribed? Were parts missed out? How did they control for overlaps and indistinct interchanges? How did they check for accuracy?

Analysis Procedure
The procedure used to analyse qualitative textual data is critical to any text-based study. Interpretations will vary enormously with the interpretative approach taken. For example a post-structural discourse analyst will come up with very different interpretations than a grounded theory social researcher. For this report, the researchers did not specify the procedure they used in the analysis. This leaves a number of important questions: Who were the readers? What were their backgrounds and orientations to the subject matter? Was there more than one reader? If so, did they confer? What interpretive theory did they base the analysis on? How were the themes identified? Were the themes identified initially in detail then grouped into clusters? Was there an attempt to interpret clusters in terms of identifiable social viewpoints? These questions are important for understanding the nature of the material that formed the basis for their interpretation.

Interpretation
Despite weaknesses in the methodology, the content that emerged in their summary of responses demonstrated enormous potential and interest for the study as a whole. Participant comments signaled the importance of interplay between ATMs and note denomination size, interplay between reel spin speed and time spent gambling and interplay between problem gambling and controlling bet size. The study touched on research possibilities with enormous potential. The interpretation is tantalizingly thin and suggests a similar study with more participants and a deeper level of analysis would improve greatly understanding of the processes involved.

In summary, this focus group approach is useful for identifying possible contributing factors and might more usefully have been undertaken as a preliminary or exploratory study at the beginning of the project.

Appendix E: Review of the THREE CIE studies

Study 1: Modifications and venue revenue at risk

Questions addressed
To what extent will proposed modifications affect gaming machine and venue revenue? (CIE Report, Chapter 3)

Findings
1. *In absence of significantly modified player behaviour*, an estimated 17 per cent of club (gaming machine) revenues and 39 per cent of hotels revenues are potentially at risk from introduction of $1 max bet.
2. It is estimated that 21 per cent of club revenue and 41 per cent of hotel revenue is at risk from all 3 modifications.

Limitations
1. Estimates are based on assumption that players do not significantly modify their behaviour in response to gaming machine modifications.
2. Sample of 29 venues (22 clubs and 7 hotels) with 3,679 machines, 24,143 club players and only 347 hotel players.
3. Assumption that tracked player behaviour (Bonuslog) is representative of all players.
4. Assumption of average game speed of 5.5 seconds (Compare with Sydney University basis of 3.5 seconds and 5 seconds?), while "Estimated revenue at risk rises considerably as game speed is slowed"- (e.g., at 4.8 seconds revenue at risk estimates drop from 17 per cent to 14 per cent for clubs and from 39 per cent to 32 per cent for hotels for introduction of $1 maximum bet).
5. Estimated average game speed of 5.5 seconds appears to be based upon Aristocrat sample of 21,724 observations for 2,472 players – this equates to fewer than 10 observations per player. Are these also Bonuslog players?

Conclusions
1. The estimates based upon game speed, machine turnover and player tracking suggest that 17 per cent of club and 39 per cent of hotel gaming machine revenue is at risk from introduction of $1 maximum bets (and 21 per cent and 41 percent respectively from introduction of all three modifications) if "players do not compensate significantly through behavioural change" in response to these modifications.

Reviewers' Comment
It seems too great a leap of faith to base future revenue projections on assumption that players will not change their behaviour to compensate to some extent for the introduction of machine modifications or that gambler behaviour in a choice situation adequately predicts behaviour in a no-choice situation.

Study 2: Qualifying estimates of revenue at risk by questionnaire responses

Questions addressed

Do questionnaire responses confirm the extent to which gamblers will modify behaviour and expenditure in response to machine modifications? (CIE Report, Chapter 4)

Findings

Questionnaire response data and observed changes in expenditure in "blind trials" of modified machines (see CIE study 3) provide support for the "reasonableness of estimates of venue revenue at risk".

Limitations

1. Similar limitations as apply to Sydney University study 1 (limitations 1 to 9) in respect of e.g., sample selection, (size here of n=538), (non-) representativeness of participants and venues, questionnaire pre-testing, validity and reliability issues, possible observer demand effect, etc., apply in respect of the CIE questionnaire data collected by Sydney University researchers.
2. Limited choice given to questionnaire respondents in means by which they can "compensate" for modifications of spending more time or paying faster.[9]
3. Unclear what proportion of questionnaire respondents were self-selected "slow play, low bet" players. Hence we are unable to estimate how representative questionnaire responses are of all players.

Conclusion

1. Approximately 60 per cent of club players and 39 per cent of hotel players say they would engage in compensating behaviour so that these players would not contribute to gaming machine or venue revenue at risk.
2. Conversely 16 per cent and 25 per cent respectively say they would switch gaming machine activities to activities outside club or hotel and average expenditure for these would fall by 34 per cent and 37 per cent respectively- suggesting a minimum 5 per cent and 12 per cent reduction in club and hotel venue revenues respectively.

Reviewers' Comment

Some reduction in venue revenue is to be expected from any gaming machine modification that is effective in reducing harm. A 5 per cent reduction in club revenue and a 12 per cent reduction in revenue as estimated here seem not unreasonable.

[9] For example, players might "compensate" by playing two or more machines simultaneously

Study 3: Qualifying estimates of revenue at risk by "blind trials"

Questions addressed

Do "Blind trials" of modified and unmodified machines effect on machine turnover and player expenditure confirm the quantum of revenue at risk?

Findings

1. Blind trials showed reduced turnover from modified machines in clubs when available in a choice situation adjacent to unmodified machines.[10]
2. Reductions in turnover increased with the number of modifications to maximum of 50 per cent reduction across clubs for all 3 modifications.

Limitations

1. Like the revenue at risk estimates based upon turnover and player tracking behaviour the blind trial study expenditure findings depend upon the (unwarranted) assumption that player behaviour in a choice situation represents future behaviour in a no-choice situation.
2. Investigation conducted in only 4 club venues.
3. Findings for hotels questionable in that introduction of $1 maximum bet on its own did not result in lower turnover compared to unmodified machine.
4. Limitations similar to those identified in Sydney University study 3: Expenditure on modified and unmodified machines.
5. Findings obtained in choice situation may not be generalisable to situation where choice between modified and unmodified machines does not exist.

Conclusion

1. The turnover differences between modified and unmodified machines obtained in these "blind trials" provide an "upper bound for estimating potential revenue losses from players"
2. While the questionnaire data suggest a lower bound of 5 per cent for potential venue revenue losses from the $1 max bet modification, the blind trials data suggest an upper bound of 24 per cent (for clubs) when choice between modified and unmodified machine are available. Given the difficulties with each approach the researchers suggest the 17 per cent venue revenue loss from introduction of $1 maximum bet for clubs appears to be best choice, as is the 21 per cent for all 3 modifications.
3. Likewise the original turnover-derived estimates of 39 per cent of hotel revenue at risk for the $1 bet and 41 per cent for all 3 modifications appears to be the "best estimate".

Reviewers' Comment

Findings not necessarily representative of proposed "no-choice" situation where only modified machines are available hence estimate of revenue at risk is not necessarily valid.

[10] Except for modified bill acceptors which showed an increase in average turnover in comparison to unmodified machines