The Relevance and Role of Gaming Machine Games and Game Features on the Play of Problem Gamblers

REPORT

Prepared for:
Independent Gambling Authority
South Australia

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The interpretations of data and secondary materials, and any conclusions and opinions expressed in this paper, are those of the researchers and do not necessarily reflect the views of either the Independent Gambling Authority, the Office of the Liquor and Gambling Commissioner, or other research contributors.

Glossary of Acronyms

Acronym	Meaning
TOD	'Time on device' – i.e., the amount of time devoted to playing a particular game by an individual player
REVPAC	'Revenue per available customer' – i.e., the amount of revenue accrued by the device by an individual player
BNA	Bank Note Acceptor
NGR	Net Gaming Revenue – i.e., from the player's perspective, the amount of money lost
EGM	Electronic Gaming Machine
TOR	Terms of reference
CIT	Computerised Information Technology
CMCS	Central Monitoring and Control System
RTP	Return to Player
SD	Standard Deviation
PAS	Player activity statement
IPART	Independent Pricing and Regulatory Tribunal (NSW)
LAB	Liquor Administration Board (NSW)
USGRU	University of Sydney Gambling Research Unit

Executive Summary

The Independent Gambling Authority of South Australia (IGA) commissioned the Australian Institute for Primary Care, La Trobe University Melbourne to examine aspects of the relationship between gaming machine technology and problem gambling.

The IGA wished to know:

- if particular gaming machine games feature more commonly in the play of problem gamblers as compared to recreational gamblers;
- whether there are particular characteristics of those games that distinguish them from other games;
- whether those differences are the characteristics that attract problem gamblers and feature in problem gambling play;
- to what extent those characteristics affect the play of recreational gamblers; and
- to what extent those characteristics feature in a gamblers' transition from recreational to problem gambler.

To address the IGA's questions the Researchers undertook:

- A review of literature with a focus on preparation of advice for the IGA in relation to the common findings, points of contention and unresolved questions found in the literature (see section 1.3 and Appendix C);
- Analysis of published data relating to the overall performance of the EGM industry in South Australia and (for comparative purposes) Victoria (see section 2);
- Analysis of EGM performance data provided by the Office of the Liquor and Gambling Commissioner (South Australia) (see section 2);
- Quantitative data collection and analysis involving 180 completed telephone surveys with regular EGM gamblers in metropolitan Adelaide (see section 3); and
- Qualitative data collection and analysis involving focus groups (50 participants) and individual discussions (14 participants) with problem gamblers in contact with Break Even gambling counselling services in metropolitan Adelaide and country South Australia (see section 4).

Implications of the review of literature

The research literature reviewed (Appendix C) demonstrates that a wide range of structural characteristics impact on gambling behaviour. Relevant primary structural characteristics include the core technology of the EGM, the reinforcement schedule which determines the number and scale of prizes and conditions players to game operation, as well as the configuration of line betting, credit value, the reel symbol ratio, fitment of bank note

acceptors and spin speed. Secondary characteristics include artwork and lighting and sound effects. The complex interrelationships between these structural characteristics produce interactive effects that shape gambling behaviour, including the production of harm as measured by problem gambling segments. Available research demonstrates that material change will lead to transformation of gambling behaviour.

The academic literature diverges on the underlying basis for the behaviour of gamblers, a divergence which may be broadly classified into behavioural or cognitive theoretical tendencies. Nonetheless, literature from both theoretical perspectives demonstrates the efficacy of material change in altering consumption outcomes. Much of the research is focused on gambler behaviour, and less published work relates to the role of core EGM technology, particularly reinforcement schedules, which remain largely the province of industrial research and development activity. The literature confirms that well-targeted material change would reduce the potential for excessive gambling. The literature also highlights that reduction in excessive gambling is a potentially vital strategy in minimising harm and reducing problem gambling levels. The literature also suggests that well-targeted material change could achieve these goals without diminishing the enjoyment or amenity of non-problem gamblers.

a). Measures that would likely minimise harm to problem gamblers include:

1. Modification of reinforcement schedules
2. Reduction in maximum bet to $1 per spin
3. Continuation of the prohibition on the installation of bank note acceptors to EGMs (in the case of South Australia); or elimination or modification of BNAs, in the latter case to limit the value of bank notes that may be accepted to a maximum of $100 in denominations of not more than $20 (in jurisdictions where applicable)
4. Reducing spin rate to 5 seconds or more between spins

b). Measures that would likely reduce the potential for excessive gambling include:

1. Modification of reinforcement schedules
2. Elimination or reduction of the near-miss effect
3. Reduction in maximum bet
4. Reducing spin rate
5. Reduction in maximum number of lines available for wagering
6. Modification of ‘free games ‘ features to limit both the number of ‘free spins’ and the multiple by which payouts are increased during the operation of features (speculative, based on present research)

c). Material changes to EGM structural characteristics that have been shown to have either no or minimal, effect on the amenity of EGM gambling in the pursuit of either a) or b) include:

1. Reducing spin rate to 5 seconds
2. Reduction in maximum bet to $1 per spin
3. Continuing prohibition on BNAs in South Australia (implied); or restriction on denominations and maximum value of notes accepted by BNAs

A major gap in publicly available research is the effect of particular configurations of reinforcement schedules, which as we have noted constitute the core technology of EGMs. Detailed information relating to the relationships between reinforcement schedules, particular pay tables and prize allocations, actual gambler behaviour and the development of gambling

problems is required. A consequential major research gap relates to the development of solutions which can render EGM games reliably safe.

Characteristics of the South Australian EGM industry

The South Australian club and hotel EGM industry was established by legislation enacted in 1992. Some relevant characteristics of the SA industry for this study include:

- There were 12,598 gaming machines operating in SA as at the end of March 2007.
- SA has a problem gambling prevalence rate of 1.6% of the adult population according to a gambling prevalence study conducted in 2005. That study also concluded that 30% of the adult population used EGMs at least once per year, and of that group 20.3% used EGMs at least fortnightly (i.e., ~ 6.1% of the adult population).
- When determining an application for approval of a gaming machine game, the Liquor and Gambling Commissioner must be satisfied that the game is unlikely to lead to an exacerbation of problem gambling, and for that purpose must have regard to game approval guidelines - the Game Approval (Gaming Machines) (No .1) Guidelines 2003 and Game Approval (Casino) (No. 1) Guidelines 2003.
- A policy of EGM reductions was implemented in 2005, and lead to a reduction in the number of gaming machines operating in SA from 14,855 in September 2004 to 12,645 in July 2005 and 12,598 in March 2007.
- There were 10.6 EGMs per 1000 adults in the SA population as at June 2006.
- Per capita expenditure on EGM gambling was $621 per adult per annum in the year to June 2006.

As a comparison to the South Australian market, there were 6.9 machines per 1000 adults in Victoria, generating average losses (NGR) of $630 per adult per annum in the year to June 2006.

High performing gaming machines

Among the ‘top 250’ EGM games operated in South Australia in 2004-05 and 2005-06, four games stand out as the ‘highest’ performing EGM games. These games were Shogun, Shogun 2, Indian Dreaming and Dolphin Treasure. Shogun and Shogun 2 are exclusively one dollar credit value games, whereas Indian Dreaming and Dolphin Treasure are predominantly one or two cent credit value.

In 2004-05 the most commonly occurring game amongst the ‘top 250’ was Indian Dreaming, but in 2005-06 (following the legislated reduction in EGM numbers in South Australia) the most prominent game in this group was Shogun 2.

These four games most prominent amongst the ‘top 250’ all generated net gaming revenue (NGR) well in excess of statewide averages. In the case of Shogun 2, NGR per annum in 2005-06 was $263,501, compared to a statewide average of $59,618 for all EGM games. Indian Dreaming and Dolphin Treasure games in the ‘top 250’ cluster averaged NGR of just under $200,000, and Shogun games, $221,857.

Analysis of available data enabled us to conclude that Shogun, Shogun 2, and Indian Dreaming games were all 'over-represented' in the 'top 250' cluster of games, whereas Dolphin Treasure was 'under-represented'. We concluded that the ubiquity of Dolphin Treasure was a key factor in its appearance in the 'top 250' and that it appeared to have been very successful in the past but appears to be waning in popularity in comparison to other three games.

Amongst these four most prominent games, average bet sizes (i.e., the amount wagered per spin or 'button push') for one cent games ranged as high as $0.79 (Indian Dreaming) and for the most prominent $1 machines as high as $3.04 (Shogun 2).

Theoretical rates of utilisation of games were calculated, showing that the most successful low credit value games were those attracting substantial rates of utilisation. High credit value games succeeded on relatively low rates of utilisation but larger average bets. This mix illustrates the importance of a balance between the industry concepts of 'time on device' (TOD) and revenue per available customer (REVPAC) in EGM gambling consumption. There appears to be a relatively predictable 'trade-off' between the credit value of machines, their rate of utilisation and the size of average bets made in strategies to maximise NGR. The product mix found in gaming rooms thus appears to be a crucial element in such strategies.

The performance of EGM games in two local government areas of South Australia (Port Lincoln and Salisbury) was analysed, suggesting that the distinct EGM densities (i.e., the number of EGMs per 1,000 adults) is likely to influence the NGR per EGM and per adult, a conclusion which has been reached in more detailed LGA based studies of other jurisdictions (see AIPC 2006) and indeed in South Australia (Delfabbro 2002, pp.116-7). In Port Lincoln, a high density of EGMs lead to low NGR per EGM but very high average NGR per adult. In Salisbury, more modest EGM density lead to high NGR per EGM and above average NGR per adult, although this was lower than Port Lincoln. Thus, the trade off between average EGM performance and density is apparent. Further studies need to control for such factors in trying to isolate the impact of EGM technology on the relative performance of EGM games.

In the context of a decline in EGM numbers (absolute numbers and density), the performance of the games identified as the 'highest' performed appear to have 'improved' compared to other machines, particularly in the cases of the Shogun 2, Indian Dreaming and Shogun. It also appears that Shogun 2 and Shogun games achieve relatively high NGR because of high average bets, whereas the Indian Dreaming game achieves comparatively high NGR because of comparatively high average levels of utilisation.

There is a *prima facie* argument that EGM games which generate high NGR do so because they are disproportionately utilised by problem gamblers. To the extent that growth in levels of consumption is correlated to increased utilisation by problem or at-risk gamblers, then there is a likelihood of exacerbation of gambling-derived harm. It is our view that systematic analysis of EGM performance is thus likely to provide a basis for continuing risk assessment of EGM games in relation to the production of harm from gambling. This would have the purpose of establishing a baseline against which a concept such as 'non-exacerbation' might be evaluated.

Regular gambler survey

A telephone survey of regular gamblers (N=180) was undertaken. There were 80 male participants and 100 female participants.

Respondents were a demographically older and female group, who were as likely to be retired as any other labour force characteristic. Over three-quarters were Australian born and as a group the respondents were relatively low income earners. Half of the respondents were non-problem gamblers, whilst just less than a quarter were problem gamblers.

In terms of gambler segments, half of the respondents scored zero on the Canadian Problem Gambling Index (CPGI) (non-problem gamblers), 44 (24.5%) scored 1 or 2 (low risk) and 29 (16.2%) scored between 3 and 7 (inclusive) (moderate risk). The remainder, 17 (9.3%) scored 8 or more (high risk). Problem gamblers (defined as those scoring 3 or more, 26.5%) were disproportionately more likely to be female.

Respondents in the problem gambler segment were more likely than non-problem gamblers to:

- gamble 2-3 times per week or more;
- gamble for more than one hour;
- not spend an hour or more on other activities in the gaming venue;
- spend larger amounts of money; and to
- end their visit to the gaming venue after all available money was exhausted.

Just over half of the respondents gambled on gaming machines weekly, sixteen per cent doing so more frequently. Average length of gambling sessions were 1 hour 22 minutes, and a similar amount of additional time was reportedly spent on average on each venue visit pursuing other non-gambling activities.

A large proportion of the respondents reported not spending very much money on gambling each time they visit. Six out of ten spent $20 or less on gambling on each visit. However, around two out of ten spent more than $50 on average on each visit. Around fifteen per cent of respondents reported always or often terminating their visit only once they had lost all their available money.

Survey respondents overwhelmingly preferred gambling on one-cent credit value machines. One-dollar machines and two-cent machines were the next most, and equally, popular.

Survey respondents' favourite machines were Indian Dreaming, Dolphin Treasure, Shogun and Treasure Chest.

Two machines were disproportionately nominated as favourite gaming machine by problem gamblers. These were Indian Dreaming (19.6% of problem gambler segment, 9.7% of non-problem gambler segment) and Dolphin Treasure (17.4% of problem gambler segment, 9.0% of non-problem gambler segment).

The difference between problem and non-problem gamblers in relation to the nomination of Indian Dreaming as favourite gaming machine was statistically significant ($p<0.05$). However, a correlation coefficient of 0.131 (using Pearson's test) would suggest this is not a strong relationship.

The majority of gamblers preferred to make minimum bets on multiple or maximum lines. Problem gamblers were statistically less likely than non-problem gamblers to make minimum bets on multiple lines, however. Problem gamblers were disproportionately over-represented amongst those making medium sized bets on multiple or maximum lines.

In terms of the attractiveness of gaming machines, respondents were heavily attracted to reinforcement amongst structural characteristics. Respondents were most strongly attracted to large payouts, frequent payouts and free games. In comparison, game features and multiple line betting were less attractive amongst fundamental structural characteristics. Respondents were also less strongly attracted to a range of design and presentation features. Respondents found the music and sound of gaming machines unattractive.

As was expected there was no significant difference between gambler segments in terms of the attractiveness of gaming machine features. The sole exception was a significant difference between problem gambler and non-problem gambler segments in relation to music and lights accompanying wins, problem gamblers finding these unattractive. This difference can likely be explained by findings of the qualitative research - problem gamblers do not like to draw attention to themselves in venues, including by winning.

Researching EGM game features with problem gamblers

A series of focus group and individual interviews were conducted with 64 problem gamblers in contact with Break Even counselling services in South Australia. These sessions occurred in the metropolitan areas of central Adelaide, Flinders University Medical Centre, Kilkenny and Salisbury, and in Port Lincoln, Port Pirie and Mt Gambier in non-metropolitan South Australia.

Overall, the findings of the qualitative research process offer strong support for many aspects of the published literature on EGM structural characteristics.

Problem gamblers' favoured strategies involved low credit bets and multiple/maximum lines. The key variable manipulated by problem gamblers was bet size, with a scaling up and down of bets occurring in anticipation of, or response to, machine events.

Research participants most consistently identified Dolphin Treasure or Indian Dreaming as their favourite game. Other more popular games included Hearts or Sweethearts, Black Rhino, Mermaids, Adonis and Shogun.

Respondents also consistently preferred games where there were frequent wins, with the occurrence of wins seeming more important in problem gambler discourse than the size of those wins. Of course big wins were also valued, but featured most often in discussion in relation to the first big win the individual had experienced. The preference for frequent wins suggests that those EGMs that pay out relatively large proportions of their RTP at the lower end of the prize scale would be most heavily featured amongst the problem gamblers' favourite machines.

Although reinforcement and the thrill of winning was important in the testimony of respondents, particularly in relation to hearing other machines paying around them, the

measure of value for money was very frequently the first and foremost consideration, directly conceptualised as the time on device that a given amount of money should typically purchase. Almost all our qualitative participants reported that finalising a gambling session usually occurred because funds with which to gamble had been exhausted.

A risk factor for excessive gambling identified by problem gamblers was an 'unthinking' mode of EGM gambling consumption often termed 'the zone', which could extend time and money expended to unsafe levels.

In terms of EGM game features that are an inducement for gamblers to play more, the clear favourite amongst problem gambler respondents was 'free' games. There were several reasons given for the popularity of free spins. First, free spins were seen as a 'double win' because they were seen as being 'paid for' by the EGM, the venue operator or other gamblers. Secondly, free spins were valued particularly on a number of popular EGMs in which the payout odds for wins during the free game features are tripled or more. Thirdly, pursuit of free games was the key identified enticement to gamblers to increase the scale of their bets. The strategy of raising the number of credits being bet was most often cited as being because free games were 'due', and thus an increase in bet size would maximise any returns, because of much increased payout odds. Credit levels would be scaled back immediately following the winning of free games.

Key research questions

Research question one: "[do] particular gaming machine games feature more commonly in the play of problem gamblers as compared to recreational gamblers?"

Analysis of data pertaining to the performance and selected characteristics of the 'top 250' performing EGM games in South Australia in 2004-05 and 2005-06 revealed that the four most successful games in South Australia (by the number of specific games appearing in the 'top 250' games list) were Shogun, Shogun 2, Dolphin Treasure and Indian Dreaming. Of these games, Shogun, Shogun 2 and Indian Dreaming were all represented in greater proportion in the 'top 250' list than they are across the South Australian EGM market as a whole. Dolphin Treasure, on the other hand, constituted a smaller proportion of machines in the 'top 250' games compared to its proportion of all EGM games in the state.

Shogun 2 and Shogun machines in the 'Top 250' returned an average NGR of $263,501 and $221,857 respectively. Indian Dreaming and Dolphin Treasure games in the 'Top 250' averaged NGR of just under $200,000. The statewide average NGR was $59,618 for all EGM games.

The EGM reduction process between 2004-05 and 2005-06 saw Shogun 2 games significantly improve their overall proportion of the South Australian market, as well as their share of the 'top 250' segment. This was also true to a lesser extent for both Indian Dreaming and Shogun games. Dolphin Treasure games declined overall and in their share of the 'top 250' segment.

The analysis of available EGM performance data showed that four games appear to 'out-perform' the rest. A reasonable conclusion to reach from this is that some proportion of the performance of these machines is due to a disproportionate amount of problem gamblers'

expenditure being directed to these machines. This is an indicator of which games problem gamblers use. It is not an indicator that these machines, in particular, are involved in the genesis of gambling problems, such that they would not have otherwise occurred had the individual gambled on different games.

The survey data collection for this project suggested that there are popular EGM games which appeal to both problem and non-problem gamblers. These include Indian Dreaming, Dolphin Treasure, Shogun and Shogun 2, Treasure Chest and Choy Sun Doa.

In the regular gambler survey, two gaming machines were disproportionately nominated by respondents in the problem gambler segment as their favourite game. The first was Indian Dreaming, which 19.6% of problem gamblers nominated as their favourite gaming machine compared to 9.7% of non-problem gamblers. The second such machine was Dolphin Treasure, which 17.4% of respondents in the problem gambler segment nominated as their favourite machine compared to 9.0% of non-problem gamblers. There was a statistically significant difference between problem gamblers and non-problem gamblers in relation to the preference for Indian Dreaming as favourite gaming machine (Pearson's correlation coefficient $r = 0.131$, $p<0.05$).

Amongst problem gambler participants in the qualitative component of this project, Dolphin Treasure was clearly the most popular game. The ubiquity and apparent durability of Dolphin Treasure in the SA market appear to be important factors in this favouritism. Other popular machines were Indian Dreaming, Hearts, Black Rhino, Mermaids, Adonis and Shogun.

The triangulation of data sources in this project identify Indian Dreaming, Dolphin Treasure and Shogun (including Shogun 2) games as the key gaming machines in the South Australian market. The evidence of the qualitative data collection and the regular gambler survey suggest Indian Dreaming and Dolphin Treasure are disproportionately popular in the gambling of the problem gambler segment. The NGR data show these machines amongst the best performed in the market. Given the findings of the survey and qualitative research, and the fact that problem gamblers are known to contribute disproportionate amounts of NGR, then it is likely that Indian Dreaming, Dolphin Treasure and, in all likelihood, the Shogun games feature disproportionately in the gambling of problem gamblers, in terms of both time and money expended.

Research question two: "whether there are particular characteristics of those games that distinguish them from other games?"

As we discuss elsewhere in this report, it is unsurprising that all EGM users will find similar configurations and characteristics of EGM games attractive, given their design objectives of maximizing 'time on device' (TOD) and maximum revenue per available customer (REVPAC). Our estimation of such characteristics as theoretical utilisation rates suggests that the Indian Dreaming and Shogun games provide examples of the differing approaches utilised by EGM designers to achieve the design objectives. Indian Dreaming and Dolphin Treasure games appear to generate high NGR by achieving very high average rates of utilisation. Shogun games achieve high NGR by achieving a high average bet level. Indian Dreaming also appears to be successful at achieving a high average bet level relative to credit value. It is almost certain that all EGM games are designed with the objective of maximizing revenue, one way or another. The four games selected for closer examination in this report, however, are distinguished by their comparative success in the South Australian market, and for this

reason make interesting if 'ideal type' subjects for a study of EGM games and game features. As we note elsewhere, this is an essentially preliminary study and it is not open to us to observe the distinct characteristics of all EGM games in any particular market. We do, however, pursue an understanding of how the design principle of revenue maximization is played out in practice by the observation of specific EGM games.

Quantitative and qualitative data collected for this project suggest that the very common free spin feature of EGM games is also very attractive to gamblers. Free spins appear to be the most important secondary reinforcement technique. Free spins and other game features are significant in achieving relatively high average bet sizes, particularly in combination with the multi-line (or in the case of Indian Dreaming, the ReelPower™) betting arrangements which permit EGM users to cover all possible winning combinations. Both qualitative and quantitative data support this conclusion. Thus, the combination of bet sizes which are large multiples of the credit value, and a high rate of utilisation, permit low credit value games such as Indian Dreaming and Dolphin Treasure to generate high average NGR.

The important core technology which we have been unable to investigate for this project is the reinforcement schedule of the various EGM games of interest. This is at the very heart of EGM technology, and is almost certainly central to the success or otherwise of particular EGM games. However, we were advised by OLGC that key data which would have enabled modelling of the differences in the operation of reinforcement schedules of particular machines were not held by the OLGC and thus were not available.

The success of the four games identified as the best performed in the SA market is largely due to their incorporation of the fundamental EGM characteristics, particularly random forms of reinforcement, designed to extend TOD and REVPAC. It is difficult to isolate particular characteristics of individual games as distinguishing them from other product offerings in the market. This is particularly the case given issues of market share, marketing, location and density, etc., some of which are covered in some detail in Section 2 of this Report.

Although it is difficult to isolate characteristics that distinguish high performing games from other games in the market, it is more possible to distinguish amongst those high performing games for which additional data were available due to this market leadership. The differences between these games in terms of average bets and utilisation rates are described in detail elsewhere in this report. However, one structural characteristic, a different configuration of multiple-line betting, separates Indian Dreaming from the other high performance games analysed. The ReelPower™ feature that separates Indian Dreaming from other high performing games allows gamblers to bet on reels, lines and combinations of the two. ReelPower™ games (the name and innovation are proprietary technology of Aristocratic Technologies) offer a greater multiple of lines that are available for gamblers to gamble.

As with other high-performing games, Indian Dreaming games in the 'top 250' returned NGR well above market average performance. In this 'top 250' cluster, Indian Dreaming also achieved much higher average bets than the popular Dolphin Treasure machine at the same credit value settings. One-cent credit Indian Dreaming games have an average bet of $0.50 compared to one-cent Dolphin Treasures games that have an average bet of between $0.33 and $0.43 (depending on their setup configuration). This equates to a difference between these two games of from 14% and up to 34% in average bet size. As the survey and qualitative data showed, multiple line betting is associated with larger bets, particularly to cover more winning options and to counter the 'near miss' effect. The higher average bet

returned by Indian Dreaming in comparison to Dolphin Treasure is thus very likely due to the greater number of lines that can be gambled. EGM gamblers appear to prefer to 'cover all bases', and Indian Dreaming offers the opportunity to do so, at what appears to be a high average bet level.

The very high average bet sizes on Shogun and Shogun 2 are due to the higher credit value of these games in comparison to other high-performing games. Although the average bet size is a much lower multiple of the minimum bet than is the case with the other high-performing games analysed, the size of the credit value determines that higher stakes are wagered on these games on average. To the extent that higher stakes induce gamblers to lose more quickly and spend more money than intended this constitutes a risk factor for excessive gambling.

The data analysis shows that much greater stakes are required to gamble on Shogun than other high-performing machines for the same period of time (see Table 5.1). Survey data showed that regular gamblers lose disproportionately large amounts of money gambling on high stakes machines relative to the allocation of time to low, medium and high stakes gaming machines (see Appendix F). Our analysis showed that Shogun and Shogun 2 achieve this disproportionately high NGR despite lower utilisation rates, which distinguishes these games from other high-performing games.

Research question three: "whether those differences are the characteristics that attract problem gamblers and feature in problem gambling play?"

Indian Dreaming was the gaming machine most strongly linked to the problem gambler segment amongst survey respondents and was popular amongst problem gambler participants in the qualitative research.

The ReelPower™ technology featured in Indian Dreaming differentiates the Indian Dreaming game from other high performing games. The higher average bet returned by Indian Dreaming, when compared to another well-performed game of the same credit value, is very likely to be linked to the additional multiple betting options that the ReelPower™ feature provides. The extent to which the additional number of lines available to gamble on ReelPower™ is correlated to higher average bet levels thus constitutes a risk factor for excessive gambling and for transition to problem gambling. To the extent that problem gamblers utilise Indian Dreaming, then the apparent tendency of ReelPower™ technology to drive average bet size up constitutes a risk of exacerbating problem gambling behaviour.

The high credit value ($1) of Shogun and Shogun 2 games means that the minimum bet on these devices is higher than the average bet on other high performing games such as Indian Dreaming and Dolphin Treasure. This is already something of a risk factor for excessive gambling given the large stakes required to play these games for a comparable length of time to other games.

Using survey data and average bet sizes, we calculated that about two-thirds of the losses incurred by respondents in the problem gambler segment are accounted for by their use of one-cent credit value games. Gambling on one-cent credit value games constitutes nearly 90% of the average amount of time the problem gambler segment spent gambling on gaming machines. In contrast, we estimate that around 20% of problem gambler expenditure is attributable to just 4.7% of aggregate game time devoted to the use of one dollar credit value

games. Gambling on one-dollar credit value EGMs such as Shogun and Shogun 2 accounts for a disproportionate amount of problem gambler losses relative to time spent on different credit value machines. This constitutes a risk that problem gambling will be exacerbated by more rapid and/or larger losses.

Research question four: "to what extent [do] those characteristics affect the play of recreational gamblers?"

The qualities of EGM technology that attract problem gamblers to spend the amounts of time and money on EGM gambling that they do are also present in the interaction between non-problem gamblers and EGMs. The primary reinforcers of frequent and large wins and free game features are the most popular characteristics with both problem and non-problem gambling segments.

The problem gambler segment of the regular gambler survey averaged losses on gaming machines of around $70 per visit to a gaming venue. This was double the average per visit loss of the non-problem gambler segment (see Appendix F). Given that problem gamblers also gamble more frequently than non-problem gamblers on average, problem gambler losses (and associated harm) will be considerably higher than those of non-problem gamblers.

The calculations in Appendix F also demonstrate that non-problem gamblers spend as much as a quarter of their aggregate losses on one-dollar credit value EGMs, higher than the proportional amount lost by problem gamblers, even though the actual amounts lost are much less. Nonetheless, this demonstrates that it is very easy to lose large sums of money on high performing EGMs, and although non-problem gamblers may be better placed than problem gamblers to limit their gambling, the data suggest that non-problem gamblers are also attracted to structural characteristics of gaming machines that encourage the staking of larger bets and the coverage of multiple or maximum lines.

The staking of larger bets and the coverage of additional numbers of lines are the key techniques by which larger amounts are spent to retain parity of TOD. A key measure of a satisfactory gambling session according to the problem gambler participants in qualitative data collection is an 'acceptable' duration for the money spent. Increasing the cost of the achievement of an acceptable TOD is the key to higher REVPAC and hence increased NGR. This basic equation is likely to apply equally to non-problem gamblers who also prefer to receive acceptable value for money, in the form of both reinforcement and entertainment.

Research question five: "to what extent do those characteristics feature in a gamblers' transition from recreational to problem gambler?"

Many of the problem gamblers who participated in the qualitative data collection undertaken for this project described how their gambling 'careers' usually commenced within an enjoyable or routine social context. This was prior to progressing to a stage where gambling was undertaken alone, and with increasing frequency and preoccupation. The prevalence of problem gambling is relatively high amongst those who gamble most regularly (as reinforced by the prevalence of problem gamblers in our regular gambler survey), so the key parameter distinguishing transition to problem gambling is likely to be increased frequency of gambling activity and extended length of individual gambling sessions.

The same EGM structural characteristics are at work on all gambler segments, designed to extend TOD and REVPAC. This may induce periodic harm via higher than anticipated losses for those in the non-problem gambler or low-risk gambler segments on occasions. However, it is likely that repetitive exposure to structural characteristics which re-configure consumption behaviour and increase the rate and/or magnitude of losses is the foundation of transition to problem gambling.

Three key structural characteristics were identified in the research as increasing the risk associated with gamblers' consumption of EGM gambling:

- High credit value games produce high average bet levels. Minimum bets on high credit value games are larger than actual average bets on low credit value games and small multiples of the minimum bet on high credit value machines lead to very large bets (examples are Shogun and Shogun 2);
- Multiple or maximum line betting on small credit value games leads to increased average bet sizes, with large multiples of small minimum bets leading to actual average bet sizes of between 20 and 50 times the minimum bet (example is Dolphin Treasure); and
- Reel betting extends the options of line betting on small credit value machines, leading to increased actual average bet sizes in excess of those achieved on comparable credit value machines that only allow line betting (example is Indian Dreaming incorporating ReelPower™ technology).

The structural characteristics identified in the research operate as inducements to increase stake and coverage. As the literature and the research data compiled for this project show, a range of factors including 'insuring' against apparent near misses, anticipating free spin features and taking up opportunities to gamble reels as well as lines operate to push average bet sizes higher. These characteristics are the basic elements of growth in both time on device (TOD) and revenue per available customer (REVPAC).

In terms of gamblers' transitions from non-problem or low-risk to moderate and high risk segments of the gambler population these factors constitute a decisive risk of excessive gambling. The three factors identified constitute a risk of excessive gambling as they institute a tendency to 'raise, increase and expand' as normal practice in the experience of EGM gambling consumption. The games analysed perform as they do in terms of NGR due to the taking up of options to bet multiples of the minimum bet, multiple or maximum lines, and in many cases both, as the survey of regular gamblers data shows. The data assembled here has highlighted that increased gambling options and high credit value games are correlated to higher average bets. The stakes required to gamble for a defined period of time (TOD) increase as average bet size rises.

Gambling-related harm largely derives from expenditure of excessive amounts of money and time. EGMs are designed to assist this to occur, some more successfully than others. EGMs which generate high average bet levels, particularly high average bet levels proportional to credit value, provide a capacity for losses and harm to escalate rapidly. The opportunity for open-ended or excessive gambling is thus the fundamental configuration of EGM gambling consumption, built into the design and structural characteristics of EGM technology. As the literature shows, the experiential dimension of gambling includes many forms of excessive gambling – going on a bender or splurge; losing control; chasing losses; becoming obsessive;

getting into 'the zone'; dissociating from life stresses; etc – all of which typically result in individual gamblers suffering harm. The transition to harmful problem gambling is the habitual or repetitive replication of these kinds of gambling experience. Unfortunately the configuring of EGM technology to achieve extended TOD and increased REVPAC means that this transition all too often results in harm production.

The potential production of harm in contemporary commercial EGM gambling markets is virtually unlimited due to 'high' parameter value settings within the governing system (as specified by the technical standards and relevant appendices which set out such values for Australian and New Zealand jurisdictions), and to structural characteristics, both of which facilitate an experience well in excess of that required to satisfy 'consumer demand' for cheap and safe amusement. The production of harm is manifested in the toll on gamblers who transition from non-problem gambler status to high risk segments. This process takes time, but the capacity for harm pre-exists, embedded in the tendency of EGM technology to push toward extended gambling sessions and increased expenditures and the setting of parameter values at levels that may exacerbate harm. The structural characteristics highlighted in this Report thus undoubtedly contribute to the risk that this transition will be made. The production of harm represents the exploitation of those gamblers who lack the necessary personal, financial or social resources to avoid the transition from non-problem or low-risk gambling to problem gambling. The number of problem gambler participants in this project whose current counselling or treatment relationship was not their first confirms an unhappy fact, that once the transition to problem gambling is made it is frequently very difficult for individuals to backtrack.

1. Introduction

1.1 Project background

The Australian Institute for Primary Care (AIPC), in the Faculty of Health Sciences at La Trobe University ('the Researchers') conducted a study of 'The Relevance and Role of Gaming Machine Games and Game Features on the Play of Problem Gamblers" for the Independent Gambling Authority of South Australia (IGA).

The project 'terms of reference' were as follows:

> Noting responses to the game approval guidelines and the anecdotal reports of problem gamblers' game preferences, the IGA, for the purpose of informing future decision making and policy development, wishes to know:
>
> - if particular gaming machine games feature more commonly in the play of problem gamblers as compared to recreational gamblers;
> - whether there are particular characteristics of those games that distinguish them from other games;
> - whether those differences are the characteristics that attract problem gamblers and feature in problem gambling play;
> - to what extent those characteristics affect the play of recreational gamblers; and
> - to what extent those characteristics feature in a gamblers' transition from recreational to problem gambler.
>
> In addition to field or other action research that may be undertaken, the Authority wishes to know of any existing relevant research, inclusive of a brief description of the research (i.e. who, what, where, when, how, why) and in particular, to be provided with an analysis of such research that systematically identifies—
>
> - common findings, including a brief description of how those findings are evidenced;
> - points of contention;
> - gaps in the research; and
> - unresolved questions.

1.2 Conduct of the project and limitations

1.2.1 Outline of project activities

A review of relevant literature to inform our understanding of the issues relevant to this project was undertaken, and this is reported in section 1.3 and Appendix C of this report.

The project then adopted three strategies for primary and secondary data collection. Quantitative data relating to 'high performance' electronic gaming machine (EGM) games in South Australia were obtained from the regulator, the Office of the Liquor and Gambling Commissioner (OLGC), and were analysed for the purpose of identifying specific games which appeared to consistently generate high net gaming revenue (NGR). The OLGC also provided some data relating to aspects of the performance parameters and set-up configuration of selected EGM games deployed in South Australia. Published data relating to the overall performance of EGM games in South Australia, and for comparative purposes Victoria, was analysed in order to develop an understanding of the relative market conditions prevailing in South Australia. These data and the analyses are presented in Section 2 of this Report.

Analysis of aggregate gaming data aimed to address the key question of whether there were EGM games that appeared to consistently 'out-perform' others. In some previous research relevant to this current project data of this specificity were not readily available, and to our knowledge such data have not been reported in relation to any Australian jurisdiction. However, the regulation of EGM gambling in South Australia is framed so that data from individual EGMs is accessible and accordingly it is possible to establish a relative performance profile for particular EGM games. Data relating to a relatively limited number of EGM games and locations was analysed in order to establish whether some games 'dominate' the EGM market, or at any rate appeared to consistently 'out-perform' others.

Agreement was originally sought to interview gamblers in EGM venues. Recruiting EGM venue patrons for research of the present type is a difficult undertaking, and requires the co-operation of the gambling industry. Unfortunately, despite the good faith endeavours of the Australian Hotels Association (South Australia), whose Chief Executive offered us co-operation on the recruitment of EGM venues as sites for undertaking interviews with venue patrons, we were unsuccessful in reaching an arrangement for timely access to hotel gambling venues for the purpose of recruiting participants for this aspect of the research. Accordingly, we adopted the alternative strategy of utilising a telephone survey.

A South Australian based market research company (Harrison Research Pty Ltd) was commissioned to undertake the telephone survey of regular EGM gamblers (we defined regular EGM gamblers as people making use of EGMs at least once per fortnight) and obtained 180 completed interviews with regular EGM gamblers. The purpose of this was to collect primary data to develop an understanding of the game preferences and playing behaviours of regular gamblers. These data and the analyses are presented in Section 3 of this Report.

A series of focus group and interviews were undertaken, involving 64 problem gamblers in contact with counselling services. This was in order to collect primary qualitative data which

would enable us to develop an understanding of the game preferences of problem gamblers, and other aspects of their approach to, and the practices they employed in, their use of EGM games. These data and the analyses are presented in Section 4 of this Report.

In following a qualitative data collection strategy in relation to 'problem gamblers' the researchers' approach was informed by previous experience (AIPC 2006) that showed that people in this category are very knowledgeable about the circumstances of their use of EGMs, the features and aspects of EGM games that they find most attractive, and the pathways which lead them to develop a problem with EGM gambling. The approach entailed arranging access to problem gamblers in counselling - that is, people who have acknowledged that they have a problem with gambling, and who have established contact with a problem gambling counselling service in order to address the problem, or key aspects thereof. Thus, the key informant group for the qualitative research outlined in this report was a cohort of self-identified problem gamblers whose predominant gambling mode was EGMs. The utilisation of a semi-structured interview or focus group approach encouraged research participants to supply their own experience of EGM gambling. This allows for the development of rich data to provide another perspective in addressing difficult research questions.

1.2.2 Limitations of this research

The limitations of the report fall into two categories. The first is that imposed by the Project Terms of Reference (TOR). The IGA was clear in their view that the research focus directly on the issues set out in the TOR, and we have largely avoided the temptation to stray into areas which, although related to the core issues, are to a certain extent peripheral to those issues. For example, socio-economic and demographic factors are directly relevant to the pattern of EGM distribution and, in turn, to relative rates of utilisation and the development of problematic gambling behaviour. However, these issues have been addressed comprehensively in a South Australian context and otherwise by others (see Delfabbro 2002, Livingstone 2001, SACES 2005, etc). Further, certain material elements relate directly to the way in which EGM users approach the conduct of the activity – for example, the provision of automatic teller machines in very close proximity to the gaming room in many venues, the extended hours of operation of many venues, the regulation of smoking in venues and licensed premises generally and the provision of loyalty programs and other incentives such as food and drink. For many gamblers these aspects of the gaming room environment clearly contribute to their gambling behaviour and are reported by some as being influential in establishing and maintaining problematic gambling.

It is not possible to entirely extract the effect of gaming machines from the socio-technical arrangements that define the EGM commercial and governmental system. Accordingly, we touch on these issues in the relevant sections of this report where not to do so would deprive the report's discussion of certain important contextual elements. The effect of the interaction of a multitude of factors in forming the conditions of possibility for the establishment of problem gambling has been increased rather than diminished in the course of the research. EGMs and their specific qualities as sophisticated technologically based artefacts are clearly key nodes in the EGM socio-technical network, but they are not the only significant elements. Venues and their accessibility, their location in the socio-economic and demographic fabric

and the extent to which they offer some form of differentially mediated exposure to risk are all broad factors which relate to the relative risk of a particular EGM game. [1]

A second limitation of the project relates to the chosen methodological approach of the research itself. We did not pursue an experimental methodology. Debates over the best way to conduct experiments involving the interaction between EGM technology and gamblers are continuing (Blaszczynski *et al* 2003; Delfabbro *et al* 2004; CGS 2003). Experimental conditions cannot replicate actual gambling contexts (Delfabbro *et al* 2004) and the naturalistic setting of field trials is disrupted by the intrusion of researchers (Blaszczynski *et al* 2003). The approach taken was a mixed social science method based on primary data collection using quantitative (survey) and qualitative (interviews, focus group) methodologies. Analysis of aggregate secondary data provided the third element of a triangulation strategy. The findings of such a methodological approach are different from those that an experimental approach would have produced. Finally, we must acknowledge that this project is in large part exploratory. Nonetheless, we believe this report provides considerable insight into the relationship between particular games and player behaviour and practices. It also assists in defining a range of issues which, in our view, must be addressed if product safety and player protection is to become a priority in the regulation of EGM games.

1.3 Review of literature and relevant research

The project Terms of Reference (TOR) required the researchers to draw to the Authority's attention any existing literature relevant to the project aims. A broad literature review was conducted prior to the formulation of primary data collection strategies and the development of detailed research questions. This literature review was forwarded to the Authority and is attached at Appendix C. The researchers are aware that the Authority is in possession of a comprehensive literature review on EGM gambling research, including analysis of policy implications (Delfabbro & LeCouteur 2003). This section does not summarise or re-describe the growing body of research on gambling that is emerging in particular from academic psychology, nor does it re-summarise the findings of the Productivity Commission Inquiry into Australia's Gambling Industries (1999). Rather the focus is on very recent literature that may not yet have been drawn to the Authority's attention and on a small number of older studies that the researchers consider particularly relevant to the Project and of particular relevance to the TOR.

The literature on the relationship between material aspects of the gambling experience and gambling behaviour is usually denoted as research into the "structural characteristics" (Griffith 1993, 1999) of gambling, including of poker machines. Griffith offers a definition of the term 'structural characteristic' derived from Cornish (1978):

> *[s]tructural characteristics* are those which are responsible for reinforcement, may satisfy gamblers' needs and may actually facilitate excessive gambling (1999, 267-8 emphasis in original).

Structural characteristics are distinguished from the "situational characteristics" (e.g. the number of venues and locations) that are designed to entice people to gamble Griffith (1999, 269). Key dimensions of the structural characteristics of gambling include: multiplier

[1] For example, on the basis of 2004-05 data provided by the Office of the Liquor and Gambling Commissioner (OLGC), only one club appeared in the top ranked 100 gaming venues (assessed by NGR), whereas there were 25 clubs in the lowest ranked 100 gaming venues.

potential (particularly the opportunity to vary odds and stakes); pay out interval; bettor involvement; skill required; win probability; and pay out ratio (Griffiths 1993, 102). Other material features denoted as structural characteristics of gaming machines include: symbol ratio proportions; near miss effects; light, colour and sound effects; naming and game themes; symbol design; multiple line betting; credit values; maximum bet sizes; etc. (AIPC 2006; Dickerson & Baron 2000; Griffiths 1993).

Australian-style gaming or poker machines thus represent a specific material assembling and combination of such 'structural characteristics'. The high levels of problem gambling associated with gaming machines in comparison to other gambling forms in Australia (Blaszczynski *et al*. 2005; PC 1999), is thought to be linked to the specific combination of 'structural characteristics' found in contemporary gaming machines (AIPC 2006; Dickerson & Baron 2000; Griffiths 1993, 1999). This phenomenon is international and also seems closely related to the location of electronic gaming machines in venues other than casinos (Ladouceur *et al*. 2005). There is a common finding internationally of a link between gambling on gaming machines, problem gambling and disproportionate levels of expenditure by problem gamblers on gaming machines (Blaszczynski *et al*. 2005; Williams & Wood 2005).

Griffiths (1993) summarises the role of 'structural characteristics' in the development of problematic, pathological or excessive gambling in relation to the British variant of gaming machines; "[w]ith its integrated mix of conditioning effects, rapid event frequency, short pay out intervals and psychological rewards, it is not hard to see how fruit machine gambling might become a repetitive habit" (1993, 117). There is thought to be a direct relationship between random and variable ratio technologies and high rates of play, rapid responsiveness of gamblers and short intervals between gambling and the achievement of wins (Delfabbro *et al*. 2005; Griffiths 1999). Noting that "[a]ddictions are essentially about rewards and the speed of rewards" (1999, 269), Griffiths argues it is therefore unsurprising that poker machines are associated with high levels of "excessive gambling" (1999, 269). Using data supplied by gaming machine manufacturer Aristocrat Pty Ltd, from 700 EGMs operating in NSW Clubs, Haw (2000) found that structural variations between different EGMs were important, with the availability of bank note acceptors and multiple line betting significantly increasing gambling turnover (Delfabbro & LeCouteur 2003, 86). Along with credit values these three characteristics were calculated to account for 70% of variance in stake size (Haw & Dickerson 1997, cited in Dickerson & Baron 2000, 1153).

There are many 'structural characteristics' of EGMs, and their effects appear complex and interrelated. However, the most fundamental literature on EGMs remains that addressed to the core technology that governs the outcomes of EGM operations in a precise and particular way. This core technology is the variable or random ratio (RR) schedules that govern the distribution of gambling stakes to the house (losses) and back to gamblers as prizes (wins). Key literature on this technology remains that of Skinner (1953, Ferster & Skinner 1957) in which the principles underpinning the theory of operant conditioning and the different effects of various types of reinforcement schedules are described in detail. It is worth noting that Skinner himself believed poker machines to be the exemplary technology that proved that his theory of operant conditioning, which he developed in experimental trials involving animals, was efficacious in relation to human beings (see Skinner on-camera interview in Zimbardo 1989). As Skinner described, various types of gambling devices will have their own forms of "auxiliary" reinforcement, but "the schedule is the important characteristic" (1953, 104).

The basic principle of Skinner's theory is that changes to antecedent events can lead to behaviour modification, where a subject engages in successive approximations that modify behaviour according to events that occur subsequent to the taking of a particular action (i.e. rewards or punishments). In the case of EGMs the basic principles of operant conditioning govern machine operations though the timing and magnitude of rewards provided to gamblers (prizes) following the activation of the EGM device. The timing and magnitude of rewards provided by EGMs can vary markedly between different EGMs, with some devices set up to provide larger wins less frequently and others set up to 'drip-feed' a steady diet of smaller wins for example. However, the governing principle of reward distribution according to a random version of the variable-ratio type of reinforcement schedule is common to all Australian-style EGMs.

Delfabbro & LeCouteur (2003) have summarised research into random ratio (RR) schedules similar to those on which EGMs are based, arguing that the intermittent nature of reinforcement on a RR schedule is "very effective in maintaining behaviour" (Delfabbro & LeCouteur 2003, 82), as people become accustomed to not being rewarded for varied and/or lengthy periods and 'learn' the value of persisting. This is consistent with Skinner's argument that behaviour learnt through exposure to random ratio reinforcement schedules is relatively more difficult to extinguish than learning through exposure to other types of schedules (Skinner 1953; Ferster & Skinner 1957).

A laboratory study conducted by Delfabbro *et al* (2005) manipulated lighting, play-speed, sound, betting options and reinforcement schedules. This study found player behaviour and preferences "consistently related to factors influencing the rate and frequency of reinforcement, although frequency was generally found to be more important than magnitude" (2005, 20) This, it was argued, provides support for Walker's (2001, 2005; Williamson & Walker 2000) original observations of preference for a mini-maxi (minimum credits – maximum lines) playing style, which maximizes the number but not the size of rewards received. This, it was also argued, also supports a preference amongst gamblers for a steady stream of immediate rewards (reinforcements) (2005, 21), which was also evidenced by a preference for "a faster rather than a slower play speed" (Delfabbro 2005, 20). The balance between smaller bets and multiple lines appears to optimise gamblers' experiences by providing both relatively frequent smaller rewards and a relatively long time on device (i.e., the length of time EGM's are utilised per gambling session) for gamblers tending toward this playing style. Accordingly, aesthetic and auditory features of EGMs were deemed to be of secondary importance.

The study by Delfabbro *et al*. (2005) is very important in the context of this research as it involves the manipulation of the core technology of EGMs, the reinforcement schedule. The basic insight that gamblers pursue frequent reinforcement is fundamental to an understanding of the interactive relationship between gaming machine technology and gamblers. The findings of the qualitative research conducted for this project are entirely consistent with this insight, with the overwhelming majority of problem gambler respondents reporting that they gamble small amounts on multiple or maximum lines. Other qualitative research with problem gamblers undertaken by the Researchers also found this to be the case (AIPC 2006). This 'style' of play can be understood as to a significant extent formatted by the core reinforcement schedule technology of gaming machines, as will be discussed later in this report. What is more problematic is understanding the complex process through which this particular style becomes adopted, and understanding why it is thought to be the most prevalent playing style amongst at-risk and problem gamblers. Other important studies of the

effect of RR schedules on EGM play have found that gamblers are more likely to increase their rate of play following small wins and slow down after relatively large wins (Dickerson 1992; Delfabbro & Winefield 1999a). These studies are also consistent with the qualitative findings of this research, described later.

The work of Delfabbro *et al.* (2005) remains the only really significant research into EGM structural characteristics which involves the manipulation of reinforcement schedules. A significant gap exists in the research literature in relation to the operation of reinforcement schedules in formatting EGM gambling and particularly the relationship between such patterned behaviour and the gambling activity of problem gamblers. Schedules are undoubtedly central to the gaming industry's understanding of the factors contributing to the success of EGM technology. Achievement of such success clearly requires some balance in the rate and manner in which gamblers' stakes are redistributed to the house (as net gaming revenue) and returned to players as wins. As Skinner summarised this balance, "too high a ratio yields a large mean profit per play but a loss of patronage. Too low a ratio yields too small a profit in spite of a ready patronage" (1953, 397). From a regulatory and harm minimisation perspective, the confounding factor in achieving this balance is the production of harm, in the form of problem gambling. This involves factors other than the simple rate of re-distribution of gamblers' stakes, but is directly related to the manner of this process (i.e., the variable and random nature of the schedules used in gaming machine technology). To date there is little research that addresses the question of whether schedules can be modified to take account of this confounding factor with the aim of reducing the industrial production of gambling-related harm. A review of the recent research literature can only lead to the re-iterating of Dickerson's questioning of "why there is not sustained interest in clarifying Skinner's (1953) claim that the partial schedules of reinforcement of gaming machine play resulted in pathological levels of gambling" (Dickerson & Baron 2000, 1155). As Dickerson also states, gaming machines are products of industrial R&D "none of which focuses on the player's thoughts", but which is focussed precisely on maintaining gambler persistence and the lengthening of time on device (TOD) (Dickerson & Baron 2000, 1155).

Behavioural explanations are, of course, *not* sufficient to explain all preferences of gamblers. For example, the preference of many problem gamblers for mini-maxi playing styles that maximize the frequency of reinforcement has been explained as a 'rational' approach (within the logic of the EGM game), 'insuring' against the prospect of seeing potential wins appear on lines that are not being played (AIPC 2006). Nevertheless, as Delfabbro (2004, 14-17) argues, "many so-called cognitive phenomena can be explained using behaviourist principles". In coming to terms with the phenomenon of problem gambling and its relationship to technology there is clearly a need to explore this insight further, in particular to produce systematic studies and analyses of the role of random ratio schedules in producing EGM gambling consumption behaviour including that behaviour categorised as problematic and/or pathological. Many of the structural characteristics discussed in the literature can be categorised as provided what Skinner described as 'auxiliary' reinforcement complementing the core technology of the distribution of prizes/reinforcements (e.g., the tones or music which accompany wins, and the prevalence of apparent 'near misses'). The precise role of other features such as availability of multiple line betting also needs to be carefully considered. At one level, multiple line betting might be best described as the major structural characteristic operating at a cognitive level to provide the opportunity to vary gambling options, increase stake size, and otherwise develop a sense of active engagement with the game (Walker 1992). However, the ultimate reward for decisions to increase stake size or lines played is increased magnitude and frequency of reinforcement and there appears little

incentive to vary gambling options in such a way as to accelerate losses without the salience of such intrinsic rewards. As Delfabbro and Winefield (1992, 427) suggest, some key cognitive and operant explanations of gambling behaviour may well be complementary.

It is also worth noting in the context of this discussion of what we are terming the 'core' EGM technology, that in determining to re-shape the emerging types of convenience gambling in their domestic market, Japanese regulatory authorities opted in July 2004 to amend Regulations under the *Entertainment Establishments Control Law* which provides the legislative framework for the pachinko and pachislot industries. The revision required changes in pachislot machines (Regulation 5). Regulation 5 was designed to change the emphasis in pachislot development toward entertainment/amusement and broad user appeal and away from higher volatility, higher per capita expenditure and a reliance on regular players. Regulation 5 has the specific intention of restricting the 'gambling characteristics' of pachislot machines whilst reinvigorating innovation in 'entertainment characteristics'. All old format pachislot machines were required to be removed from operation by September 2007 (Sega Sammy 2007; Sankyo 2006).[2]

The Authority would likely benefit from monitoring the effect of these material changes to core device technology. It should also be noted that after the initial shock of exposure to this regulatory risk, leading manufacturers such as Aristocrat report a surge in sales of modified and new Regulation 5 games into Japan (Aristocrat 2007). Regulatory risk thus also appears to present an opportunity for innovation and renewed competition for market share amongst manufacturers. It is also clear that material change to the core technology – or transformation in 'machine events' (Dickerson *et al*. 1992) – has direct effects on the consumption of EGM gambling as measured by the proxy of expenditure or net gaming revenue – the losses accrued by gamblers.

Research into other 'structural characteristics' of gaming machine technology is more plentiful. Blaszczynski *et al.* (2001) were commissioned to test modifications to three 'structural characteristics' of EGMs in response to harm minimisation recommendations made by the New South Wales Liquor Administration Board.[3] This is a key study, in that it is the only research that has attempted to evaluate material change to EGM technology as a harm minimisation measure in actual gambling venues. The study compared results from EGMs with the spin-rate reduced from 3.5 seconds to 5 seconds, note acceptors that accepted only up to $20 banknotes (excluding $50 and $100 notes), and a maximum bet size reduced from $10 to $1, in various combinations, with unmodified control machines. A matrix of experimental machines was set up featuring all possible combinations of the modifications. Gambling behaviour on the modified and control machines was observed in both club and hotel venues in NSW. In the conduct of the study the researchers found that:

- a higher proportion of problem gamblers than recreational gamblers use high denomination notes inserted into BNAs;
- limiting BNAs to $20 reduced EGM expenditure by 42%;

[2] See http://www.smh.com.au/news/xchange/punters-like-iags-foray-into-uk/2006/12/06/1165081019211.html, http://www.theaustralian.news.com.au/story/0,20867,20865055-643,00.html, http://www.ntnews.news.com.au/printpage/0,5942,20865392,00.html (all last accessed 26 Feb 2007).

[3] Consultation with the NSW LAB confirmed that the recommendations contained in their *Determinations* on modifying technical parameters of EGMs for harm minimisation purposes, which included the reduction of maximum bets from $10 to $1, were informed speculations about appropriate thresholds where material change might be effective in reducing problem gambling and not evidence based findings.

- a higher proportion of problem gamblers than recreational gamblers play EGMs at a rate faster than 5 seconds per spin;
- more than three times the proportion of problem gamblers (7.5%) in comparison to recreational gamblers (2.3%) placed maximum bets in excess of $1; and
- the preference for relatively large bets per spin was a consistent predictor of gambling problems and of the severity of those problems.

It has been argued that the 'quasi-experimental' conditions of the study under which the results were produced may have "reduced the likelihood of obtaining clear differences between the machines subject to the different manipulations" (Delfabbro *et al*. 2005). Methodological issues have been the subject of ongoing debate amongst researchers and peer reviewers of this study (see Blaszczynski *et al*. 2003; Delfabbro *et al.* 2005; Ladouceur *et al*. 2005b; Tse *et al*. 2003).

In a later published paper stemming from the Blaszczynski study, the researchers firmed up their conclusion that "lowering the bet size would reduce the level of harm associated with gambling" (Sharpe *et al*. 2005, 518). The researchers found that:

> lowering the maximum bet size means lowering the number of credits that are staked per line. Although only a small proportion of participants in this study bet over the one-dollar maximum bet, the majority of these were probable problem gamblers. Comparing play on modified machines (one dollar maximum bet) with machines with a $10 maximum bet reduced time spent gambling, number of bets and losses (Sharpe *et al* 2005, 518).

In contrast, the research found no evidence that slowing the spin rate was likely to be an effective harm minimisation measure. Another study (Sharpe *et al*. 2005), however, "has demonstrated that the number of credits per line is predictive of problematic levels of gambling" (Sharpe *et al* 2005, 516) and that "problem gamblers play more quickly than non-problem gamblers" (Sharpe *et al* 2005, 517).

A second paper emerging from the Blaszczynski study specifically addressed the question of whether gambling on the EGMs subject to the three structural modifications impacted on gamblers' enjoyment and/or satisfaction (Blaszczynski *et al*. 2005). It was hypothesized that problem gamblers would notice the three modifications more frequently than recreational gamblers, however this was not supported and the majority of participants (75%) did not recognise a single modification (Blaszczynski *et al*. 2005, 195). Slower spin rates (wager cycles) negatively impacted on the satisfaction and enjoyment of gamblers, but not sufficiently to reduce their desire to continue gambling (Blaszczynski *et al*. 2005, 195). Neither limiting bill acceptors nor reducing the maximum bet had a significant impact on gamblers overall in hotels. However, problem gamblers had a preference for machines with reduced maximum bets whilst recreational gamblers preferred the unmodified maximum bet (Blaszczynski *et al*. 2005, 195). Amongst club gamblers, satisfaction was negatively effected where there was a logical mismatch between the size of bet allowed and the denomination of banknote that could be used in a machine. Where large bets were allowed, but only $20 could be introduced into the BNA, or where bet size was restricted but larger denomination banknotes could be used, this mismatch was viewed negatively by the predominantly recreational club gambler sample (Blaszczynski *et al*. 2005, 195-6).

The results from the satisfaction and enjoyment questions included as part of the NSW structural modifications study provide an interesting complement to the harm minimisation

findings summarised in Sharpe *et al*. (2005). Whilst reducing the maximum permissible bet produced a positive harm minimisation effect in the study, this did not translate to a reduction in the amenity of gamblers, aside from a small negative effect in EGMs where the BNA's parameters were not coordinated with the allowed scale of maximum bets. This is an example of a material change to EGM operations that results in a harm minimisation benefit without apparent loss of amenity to recreational gamblers. Sharpe *et al*. (2005) also found that problem gamblers play more quickly than non-problem gamblers, and whilst slower game cycles had a negative impact on enjoyment this effect was very small and did not reduce intentions to continue gambling (Blaszczynski *et al*. 2005, 191-3). Although the Blaszczynski study found no harm reduction effect, this appears to be an example of a material change to the operation of EGMs that does not impact on the amenity of problem or non-problem gamblers whilst limiting the rate at which gambling losses occur, therefore reducing the potential for excessive gambling (Griffiths 1999). A similar conclusion can be drawn in relation to BNAs. As problem gamblers are more likely to use large denomination banknotes than recreational gamblers, and limiting BNAs reduces expenditure, a reduction in the potential for excessive gambling is also apparent, with the added benefit that, provided BNAs and maximum bet sizes are appropriately coordinated within EGM parameter settings, no reduction in the amenity of recreational gamblers is expected.

The importance of material modifications to 'structural characteristics' such as spin speed or game cycle times is also highlighted by a study of Canadian video lottery (VLT) games by Labouceur and Sévigny (2006). They found that increased speed equated to greater monetary risk and less awareness of how many games had been played. However, slowing down the speed of VLTs did not interrupt concentration, reduce motivation or change gamblers' control over time and money spent. Ladouceur and Sévigny also found that whilst gamblers gambled more games on higher speed VLTs they did not tend to extend the length of time spent gambling 2006, 6). This study would tend to support the interpretation of Blaszczynski *et al*. (2005) described above, that is, that the capacity to gamble rapidly increases the risk of excessive gambling, yet slowing down the device's play rate to limit this potential for harm does not seem to adversely effect or otherwise intervene in the process of gambling.

An experimental study by Côté *et al*. (2003) investigated the 'near miss' effect on gaming machine gambling activity. Skinner (1953, 397) noted that "by paying off very generously – with the jackpot – for 'three bars,' the device eventually makes two bars plus any other figure strongly reinforcing. 'Almost hitting the jackpot' increases the probability that the individual will play the machine, although this reinforcer costs the owner of the device nothing". From different theoretical perspectives, Griffiths (1999) and Walker (1992) have also argued that arrangements of symbols on virtual reels that include all but one symbol required for a win are likely to encourage gambling as wins appear close. On the other hand the proximity of near wins can have a 'conditioned frustration' effect (Côté *et al*. 2003). Qualitative research with problem gamblers conducted by the authors in Victoria (AIPC 2006) found that one of the motivations for gambling on maximum lines is the desire to 'insure against' wins occurring on lines not being played. The design and layout of EGM screens can thus be understood to be intertwined in a complex way with the popular tendency to gamble on maximum lines (Walker 2001, 2005; Williamson & Walker 2000). Yet, as Delfabbro and Winfield (1999b, 447-5) argue, a precise operational definition of what constitutes a near miss, and how this might vary according to the strategy (e.g., number of lines gambled) deployed by gamblers, has not been developed. In their study, Côté *et al*. (2003) exposed two groups of gamblers to identical gambling experiences in terms of wins and losses. The experimental group received 27% near misses compared to none for the control group. The

results found that the experimental group played significantly more games (M = 72) before stopping, compared to the control group (M = 54) (Côté *et al*. 2003, 437). The authors argued that whether behavioural (conditioned reinforcement) or cognitive (irrational beliefs or erroneous cognitions) explanations were advanced, the simple fact remains that near misses increase the expenditure of time and money on VLTs (Côté *et al*. 2003, 438). The 'near miss' or 'near win' appears to be another example of a 'structural characteristic' that at the very least increases the risk of excessive gambling behaviour through increased persistence. At the same time, covering all lines means raised gambling stakes, increasing the frequency of reinforcement and the interaction of gamblers with auxiliary reinforcement effects that can be experienced as 'positive' (anticipation of a win) or 'negative' (frustration).

Ladouceur and Sévigny (2005) conducted two experiments investigating the effect of making a stopping device available to gamblers on VLTs so that they could 'stop' the virtual reels at a time of their choosing. The rationale for the first study was to test the hypothesis that allowing gamblers to intervene to prematurely complete the game cycle would lead to changed cognitions about game events and outcomes. The rationale for the second study was to test the hypothesis that allowing gamblers to shorten the game cycle would lead to an increase in the number of bets made in the course of a gambling session. Both hypotheses were confirmed by the experimental results. After exposure to the stopping device, 87% of gamblers in the first study believed the virtual reel display could differ depending on the timing of their activating the stopping device, 57% believed this was a way to control game outcomes, 41% believed skill was involved and 26% had acquired the 'illusion of control' (Ladouceur & Sévigny 2005, 122-4). Gamblers in the second study who had access to the stopping device were found to play twice as many games as the control group (Ladouceur & Sévigny 2005, 128-9). The authors interpreted this study as evidence that the stopping device increased gambling persistence and hence the likelihood of excessive gambling Ladouceur and Sévigny 2005, 129).

The two studies by Ladouceur and Sévigny (2005), like those by many other researchers (Griffiths 1993; Loba *et al*. 2001, for example), highlight the relationship between the materiality of gambling technology and the cognitions of gamblers. By introducing a material change that involves the active participation of gamblers to operate the device the experiment was argued to illustrate transformation in the beliefs held by gamblers. The studies again highlighted a factor that is consistent in the research, in showing the mutability of the interactive relationship between gambling technology and individual gamblers. In other words, many material changes to gaming technology do result in alterations in the practices of gamblers. The interpretations made in much of the literature described above tend to overlook this very obvious yet important factor. The effect proven, the theoretical explanations favoured by researchers, be they behaviourally or cognitively based, often appear largely a matter of theoretical and sometimes personal preference (see Delfabbro 2004 for a discussion).

Extending this argument beyond the discipline of psychology, it could be argued that an explanation such as the 'illusion of control' (Langer 1975) could easily be re-interpreted from a perspective grounded in theories of practice (Bourdieu 1980) as a 'sense of agency' or 'feel for the game' at hand, a practiced embodied understanding that actions have consequences in the context in which they are framed. From this perspective changes in the configuration of the embodied relationship to the game, such as introducing a stopping rule, could be expected to produce a re-newed sense of active agency and feel for the game. Such a theory could equally well explain the modifications in behaviour that occurred in relation to the stopping

rule, but without necessarily arguing that individuals cognitively relate such a change to factors such as 'increased expectation of success'. This line of thinking seems intuitively compatible with the notion of 'bettor involvement' (Griffiths 1993, 102) and is open to a range of intertwined embodied, cognitive and learning aspects to behaviour.

Qualitative research conducted by the authors of this Report with problem gamblers in treatment in Victoria found that some game features were very important to a game being experienced as rewarding by gamblers (AIPC 2006). In particular, a majority of gamblers were excited by winning free games/spins. Most of these gamblers valued the higher odds paid on wins occurring during a free game feature on many machines. Gamblers gained a sense of satisfaction when 'playing with someone else's money' for a period. Many gamblers would 'scale up' their bets in anticipation of winning free games so as to maximise the rewards from these better odds. Similarly, gamblers would report returning to a 'base' playing strategy – often minimum bet on multiple or maximum lines – following the winning of free games (AIPC 2006). Despite the strength of this result in this study no support could be found for this finding in the literature.

Finally, literature has also emerged regarding the material modification of EGMs to incorporate improved consumer safety measures (Dickerson 2003; IPART 2004) within a public health framework (Blaszczynski *et al*. 2004; Korn & Schaffer 1999; Korn *et al*. 2006). This literature has not been subject to close scrutiny in this project, as the project TOR have been interpreted to relate to the operations of EGM games rather than to attempts to modify public understanding of these operations and to change public behaviour, although this said it is likely that a comprehensive public health approach to the issue of EGM gambling would encompass material change to the operations of games and game features. Many other measures seek to modify EGM gambling behaviour through the provision of information. Such measures include enforced interruptions to play, warning signs on the screen (Steenbergh *et al*. 2004) and the provision of tracking data on expenditure by gambling session and by other self-defined parameters that may enhance the self-management of gambling consumption behaviour (Focal Research 2007). Other measures such as card-based access to gaming machines (Nisbet 2004) seek to modify the relationship between access to funds, gambling budgets and gaming technologies (Dickerson 2003). These measures seek to build a reflexive component into the relationship between gambling technologies and gamblers, providing the capacity for 'responsible' gamblers to be informed, self-monitoring and self-governing consumers.[4] Building reflexivity into the real-time relationship between gamblers and gaming machine technologies by building the capacities and capitals of gamblers could transform the relationship between gambling technologies, expenditure and problem and pathological gambling to some extent. However, the direction of this research is toward the transformation of gamblers rather than of fundamental gaming technologies (other than in relation to information, access or management) and as such is largely tangential to the TOR for this study.

1.3.1 Implications of the current state of knowledge

[4] Aristocrat have also produced 'responsible gambling' EGMs now required for the Queensland market, albeit with a focus on presentation and information for gamblers rather than structural characteristics. See http://www.news.com.au/adelaidenow/story/0,22606,20789020-5005962,00.html, (last accessed 26 Feb 2007).

The research summarised above focuses on the role of 'structural characteristics' of gaming machine technology in shaping gambling behaviour. The research indicates quite clearly that material changes to gaming technology is likely to lead to transformed gambling behaviour. The literature then interprets these changes in terms of theoretical explanations. These explanations can be broadly categorised as based in behavioural and cognitive psychological theoretical paradigms.

It is not the intentions of the Researchers to make judgements about the relative worth of the interpretations reached by leading researchers in these fields, most of whom are academic psychologists with long histories of peer review and professional accomplishment. Neither do we seek to engage with methodological debate within the research literature, particularly that between experimentalists and non-experimentalists, those who conduct research in actual venue settings and those who prefer the laboratory. The Researchers are neither psychologists nor experimentalists and these debates are largely matters of incremental methodological and theoretical progress conducted within the professional discipline.

The published and publicly available research discussed above is, of course, only part of the research produced on EGM technology. A great deal of the research into EGM device technology is conducted by gaming businesses and is proprietorial in nature. Such research is thus not available for consideration in Reports such as this, conducted on behalf of public agencies. This reduces the comprehensiveness and coverage of reports generated as part of national and state/territory research programs providing guidance to processes of governing of the gaming industry. Many researchers and regulators do in the course of their professional activities have informal or confidential access to industry research. On such a basis it can be stated with some confidence that the publicly available research covers the terrain well in relation to gambling behaviour. However, there is a clear shortfall in the area of the core technology of reinforcement schedules, an area in which industry research has been historically concentrated.

It is uncontroversial that the consumption of EGM gambling is continuous, repetitious and can be sustained for long periods of time. The triggering of the internal operation of the EGMs random number generators (RNGs) is followed by the receiving or denying of reinforcement in terms of monetary rewards. The game outcome is accompanied by the operation of graphics, sounds and lighting, near miss and other auxiliary reinforcement effects. Extended periods of EGM consumption can thus have a significant operant conditioning effect. The game process itself therefore produces a theoretical risk of problem, pathological or excessive gambling behaviour. Current levels of actual harm reflect this risk. It is a political and social question as to whether modifications to the theoretical risk produced under current arrangements, particularly the operative structural characteristics of gaming machine technology, should be introduced to attempt to reduce the actual harm currently produced and what balance of commercial, regulatory and public health goals should be sought. The material changes that would best achieve a reduction in the current levels of actual harm production remain a technical question. Table 1.1 below, summarises the structural characteristics of gaming machines, identified as relevant to this question by the review of literature.

Table 1.1 Basic structural characteristics of gaming machines

Structural characteristic	Operation	Effect
Variable/random ratio schedule	Governs frequency and magnitude of payouts (wins)	- Reinforcement leading to persistence

		- Preference for frequent reinforcement leading to multi-line betting
Multiple line games	Provides opportunity to gamble on a number of lines simultaneously	- Maximum lines maximise frequency of reinforcement - Minimum lines maximise frequency of near misses/wins - Changing strategy confers experience of agency (sense of active bettor involvement) - Increased lines gambled leads to increased stake sizes per gamble
Credit value	Cost of minimum bet and base for calculation of larger bets	- Determines scale of betting leading to different rates of losing - Determines magnitude of minimum reinforcements
Reel symbol ratio	Number of winning symbols that can appear on each virtual reel	- Determines probability of winning symbols appearing on screen without a win occurring - Leads to experience of near miss/win
Lighting, sound, music	Aesthetic features of device	- Provide auxiliary reinforcements when associated with wins - Classical conditioning
Spin speed/length of game cycle	Rapidity of repetition	- Increased persistence - Increased rate of losses
Maximum bet size	Parameter value	- Limits size of largest bet - Determines scale of possible losses per spin
Maximum credit limit	Parameter value	- Limits amount of money that can be held in device as stakes
Bank note acceptor	Cash handling device	- Limits denomination of banknote that can be introduced to device - Influences potential rate of losses
Game features (e.g., free games, game within game)	Provides additional entertainment-experiential component	- Provides auxiliary objective for gambling associated with enhanced monetary reward - Influences gambling strategy - Access can be linked to bet size

The research literature confirms that material changes to EGM technology will bring about changes in gambling consumption. A range of effects could be seen in the various studies reviewed. From the literature it is evident that well-targeted material change could: a) minimise harm; and b) reduce the potential for excessive gambling. In addition it appears likely that such well-targeted material change could quite possibly be achieved without: c) reducing the enjoyment of EGM gambling, particularly the amenity of non-problem gamblers.

a). Measures that would likely minimise harm to problem gamblers include:

1. Modification of reinforcement schedules
2. Reduction in maximum bet to $1 per spin
3. Continuation of the prohibition on the installation of bank note acceptors to EGMs (in the case of South Australia); or elimination or modification of BNAs, in the latter case to limit the value of bank notes that may be accepted to a maximum of $100 in denominations of not more than $20 (in jurisdictions where applicable)
4. Reducing spin rate to 5 seconds or more between spins

b). Measures that would likely reduce the potential for excessive gambling include:

1. Modification of reinforcement schedules
2. Elimination or reduction of the near-miss effect
3. Reduction in maximum bet
4. Reducing spin rate
5. Reduction in maximum number of lines available for wagering
6. Modification of 'free games ' features to limit both the number of 'free spins' and the multiple by which payouts are increased during the operation of features (speculative, based on present research)

c). Material changes to EGM structural characteristics that have been shown to have either no or minimal, effect on the amenity of EGM gambling in the pursuit of either a) or b) include:

1. Reducing spin rate to 5 seconds
2. Reduction in maximum bet to $1 per spin
3. Continuing prohibition on BNAs in South Australia (implied); or restriction on denominations and maximum value of notes accepted by BNAs

A major gap in publicly available research is the effect of particular configurations of reinforcement schedules, which constitute the core technology of EGMs. Detailed analysis of the relationships between reinforcement schedules, pay tables, and *actual gambler behaviour* is required to understand the development of gambling problems. A consequential major research gap relates to the development of solutions which can render EGM games reliably safe.

Points of contention in the literature typically do not centre on findings or effects. Contention largely revolves around explanation. Competing theoretical perspectives form the basis for differing interpretations of the effects found in gambling research. Such explanations are not necessarily of primary importance to policy makers. Whilst the same results can, and will always, be interpreted in a variety of different ways, actual material variations producing a perceptible, predictable and reliable effect are of most interest and importance to the improvement of EGM game safety. For example, behavioural and cognitive explanations abound for the common practice of EGM gamblers, including problem gamblers, to bet minimum credits on multiple or maximum lines. From a behavioural perspective this is primarily the result of repeated trials leading to a maximising of the frequency of reinforcement. From a cognitive perspective this is a rational strategy designed to avoid near misses or to provide the best opportunity to win. These are complementary research findings that confirm the involvement of the availability of multiple line-betting in risk factors such as gambling persistence, increased staking and higher rates of gambling losses. From the perspective of formulating effective policy the key is the material modification to the risk factor identified, not the unresolved and unresolvable theoretical contentions around explanation for the effect observed.

1.4 EGM technology and consumer safety

Consideration of, and research into, material change to EGM technology is motivated by the goal of reducing the harm suffered under current EGM gambling consumption arrangements, particularly by 'problem gamblers' and their close associates. However, a secondary proposition is that any such intervention(s) should not reduce the well-being (enjoyment) of non-problem or 'recreational' gamblers. As one Australian jurisdiction puts it, '[r]responsible gambling is about minimising harm caused by problem gambling while accommodating those who gamble without harming themselves or others' (Victoria Department of Justice 2007). The policy and regulatory orthodoxy has been that looking after the welfare of what has traditionally been thought of as the few (problem gamblers) has to be balanced against the interests of what has always been thought of as the many (recreational gamblers). Material change to EGM technology would be experienced by the entire population of EGM gamblers, and regulators have been hesitant to embrace changes that might lead to a decline in the popularity of EGM gambling consumption amongst 'non-problem' gamblers. However, there is little formalised discussion of, or research evidence about, how the impact of any such changes might be distributed across this population. For example, would material change to EGM technology actually detract from the well-being of non-problem gamblers? If so, in what ways? What changes in the experience of non-problem gamblers might be acceptable? What would non-problem gamblers say if asked to consider a possible trade-off between their enjoyment and the protection of more vulnerable consumers?

Research investigating ways to re-configure current EGM gambling consumption arrangements, as summarised in the previous section, has certainly produced some clear evidence. The nexus between EGM gambling consumption, excessive expenditure of time and money and personal and social harm is well recognised and accepted (PC 1999; Banks 2002; SACES 2005), yet has proven intransigent to gambling harm prevention and (quite probably) treatment measures undertaken to date. Prevalence studies have estimated that 0.8-2.4% of the Australian population are problem gamblers, whilst the number of regular gamblers who are problem gamblers is at least 15% (Banks 2002, 2). Problem gambling has been strongly associated with EGM gaming consumption (PC 1999). The Productivity Commission estimated that problem gamblers contributed 42.3% of EGM gambling expenditure. This has been confirmed by more recent studies (see Livingstone & Woolley, 2007). The problem gambling-EGM revenue nexus means material changes to minimise social costs from EGM gambling are unlikely to be 'revenue neutral', particularly in the short run. Policies that reduce levels of EGM gambling consumption by problem gamblers are therefore likely to significantly impact on private and state revenues. If such measures, as a by-product, also reduce the number of committed heavy gamblers escalating their gambling activity to harmful levels, then there would also be a problem gambling prevention effect that would likely further reduce or delay the realisation of EGM gambling revenue streams.

In the face of this, the current argument appears to be that public policy measures to alleviate problem gambling or other public health problems derived from some form of economic activity or consumption need to have a sound evidence base. However, we would argue that unless the revenue base is the only priority (we would hope that the wellbeing of the population takes precedence over revenue considerations for Australian governments, particularly relatively marginal revenue considerations) the direction of the argument around the evidence base can quite properly be reversed. For example, what evidence supports the

argument that material re-configuration of the EGM system would reduce the enjoyment or general utility of recreational gamblers? Measures to reduce the potential for harm may reduce the losses of recreational gamblers, but there is no evidence that this would reduce utility. In fact the opposite may be the case. The argument that there is a necessary connection between measures to reduce problem gambling and a decline in the enjoyment of recreational gambling has no evidence to support it. For example, a reduction in maximum bet size to $1 would have minimal if any effect on recreational gamblers, but is likely to reduce the rate of player losses and minimise the harm experienced by problem and at-risk gamblers. In NSW, as another example, reduction of the maximum banknote 'load-up' from $10,000 to $100 would be highly unlikely to reduce the enjoyment of the overwhelming majority of recreational gamblers, but appears likely to reduce losses and harm for problem and at-risk gamblers.

Public policy is also to some extent a process of trial and error – it cannot be claimed, for example, that the decision to place warning signs on EGMs could be absolutely guaranteed to not reduce the enjoyment of recreational gamblers prior to their implementation. However, the subsequent anecdotal evidence would seem to be that recreational gamblers have not suffered a decline in their enjoyment due to the presence of warning signs.

There is a tendency in the field of public policy in relation to gambling to confuse the general population and the population of gamblers. On the estimate of the most recent prevalence survey conducted in South Australia, 69.8% of the South Australian population do not participate in EGM gambling at all (South Australia, 2006, 30) and therefore would be totally unaffected by public policy measures (with the possible exception of those non-gamblers or non-EGM gamblers whose lives are presently, or will in future be, adversely affected by the problem gambling of others, and whose experiences would be positively affected by measures to reduce EGM related harm). In other words, revenue considerations aside, it is a simple fact that a very substantial majority of the population would not be affected at all by public policy measures to materially re-configure the EGM gambling sector in the interests of reducing social harm, noting that the costs of problem gambling are borne by society at large. It is important to be clear about this because, as is summarised below, there is clear evidence that harm is suffered by a significant proportion of the EGM gambling population and a large proportion of those who gamble on EGMs regularly.

The Productivity Commission estimated that total participation in EGM gambling was 39% of the adult population. This figure was slightly higher (41%) in South Australia. However, only 25% of these EGM gamblers participated in EGM gambling at least once a month (PC 1999, 10). This equates to 9.75% of the adult population nationally (10.25% in SA). Only 11% of those who participated in EGM gambling did so at least once week (PC 1999, 10). This equates to about 4.3% of the adult population nationally (4.5% in SA). If we were to assume that the 2% or so of the population estimated by the PC to be problem or at-risk gamblers participate at least once a week, then simple arithmetic indicates that just less than 1 in every 2 EGM gamblers who gamble every week are problem or at risk gamblers. More recently, the 2005-06 South Australian prevalence study indicated that the rate of EGM use in the general population had declined to around 30.2% of the population. Of these people, 11.2% used EGMs at least weekly, equating to about 3.4% of the general population (South Australia 2006, 34). That study also estimated the prevalence of moderate and high risk gambling at about 1.6% of the population (South Australia 2006, 115), and that more than 91% of this group played poker machines (South Australia 2006, 124). Thus the most recent South Australian study is broadly consistent with the PC's earlier study. By any measure, it is highly

likely that frequent or very regular gamblers include a high proportion of moderate or high risk gamblers, perhaps approaching one in two.

Such calculation of the proportion of weekly EGM gamblers who are problem gamblers should of course be taken as an estimate only. However, evidence is emerging about the density of problem gamblers in hotel and club gaming rooms in Australia that appears to strongly support this estimate. One recent study, conducted in Victoria with the cooperation of gaming venues across the state, surveyed a total of 418 EGM gamblers about their EGM gambling (Caraniche Pty Ltd 2005). The researchers endeavoured to recruit a representative sample of respondents by recruiting: across a range of metropolitan and non-metropolitan venues; in different operator venues[5]; at different times of day; on different days of the week; and at different stages of gambling activity (pre-, during and post-gambling) (Caraniche Pty Ltd 2005, 78-81). The Canadian Problem Gambling Index (CPGI) was administered to all respondents to enable the researchers to discern between 'recreational' and 'problem' gamblers (Caraniche Pty Ltd 2005, 78). Based on CPGI scores the respondents were allocated to sub-groups as follows: non-problem gamblers 31.1%; low-risk gamblers 16.5%; moderate-risk gamblers 25.4%; and problem gamblers 27.0% (Caraniche Pty Ltd 2005, 81).

The recruitment process inside gambling venues thus produced a sample including 52.4% who were either current problem gamblers (27.0%) or were at-risk of problematic gambling behaviour or becoming problem gamblers (25.4%) (Caraniche Pty Ltd 2005, 80). Unless an inadvertent over-sampling of problem gamblers occurred – and given the stratified sampling process used by the researchers this seems unlikely to any significant extent – this raises serious questions about risks to regular patrons of gaming venues.

In NSW, participants in a study of structural modifications and harm minimization in NSW were screened using the lifetime SOGS measure Blaszczynski (2005a). It was found that 20% were current problem gamblers, even using the more stringent cut-off level (SOGS score 5+). Blaszczynski *et al* (2005a) also noted anecdotally that many of those who were known to frequent venues to gamble on a daily basis were reluctant to take part in the study. Blaszczynski (2005b) has subsequently estimated that nationally 18-25% of those present in gaming venues at any one time are likely to be current problem gamblers.

There are therefore significant indications that between 20-27% of EGM gamblers in club and hotel gaming venues are problem gamblers and that a similar additional proportion are at-risk of becoming problem gamblers. This figure has been calculated across a range of venues in two states, and is broadly supported by evidence from the 2005 South Australian prevalence study, which indicates that amongst EGM users, only 20.3% gambled at least fortnightly, (equating to 6.1% of the adult population) (South Australia 2006, 34). Amongst frequent gamblers generally, 10.8% were high risk and another 30.3% moderate risk gamblers (South Australian 2006, 122). This survey also reports that 77.1% of moderate risk and 82.2% of high risk frequent gamblers gambled at least weekly (South Australia 2006, 122), and 91.1% of moderate risk and 93.3% of high risk frequent gamblers used EGMs (South Australia 2006, 124). In particular types of relatively high-risk venues (AIPC 2006) there is a possibility that the situation may generate even greater risk of problematic gambling. Formulated this way, the question for public policy thus becomes somewhat different. Non-problem gamblers make up only around half of the gamblers in gaming venues at any given time. Material changes to technology should primarily be designed to protect such regular EGM gamblers, who are at

[5] In Victoria venues are provided with EGMs by one of the duopoly operators, Tattersalls' or Tabcorp.

greatly enhanced risk. Should the test for such modifications be whether there is any reduction in enjoyment for those intermittent EGM gamblers who gamble much less regularly, or only occasionally? This question becomes even more serious when the contributions of problem, at-risk and non-problem gamblers to EGM gambling losses are considered.

Problem gamblers and those at risk contribute a disproportionate amount of Australian EGM expenditure (PC 1999, Appendix P, P16). Since the PC Report problem gamblers in Victoria have been found to spend nearly three times the amount spent by non-problem gamblers ($A103 versus about $A36), and to make six times as many visits to automatic teller machines (ATMs) (Caraniche Pty Ltd 2005). Problem gamblers spent around six times as much as non-problem gamblers, totalling $A443 per week or over $A23,000 annually (Caraniche 2005, Table 5.10) (The PC estimated that problem gamblers spent on average about 18.9 times more than recreational gamblers) (PC 1999, p. 5.21). As a recent Canadian study analysing survey results from Ontario summarised: 'gambling related problems were related to an individual's level of consumption' (Chipman *et al.* 2006, p. 24).

The PC estimated that severe problem gamblers contributed about 33.7% of the total expenditure on EGMs, and moderate problem gamblers another 8.7% – a total of about 42.4% (PC 1999, Appendix P, P16). A recent Northern Territory prevalence survey produced a very similar estimate – 43% (SSPR 2006, 46). Williams and Wood (2004, p. 42) estimated that 'about 35% of Ontario gaming revenue is derived from moderate and severe problem gamblers' and suggest that '[u]p to 60% of revenue from gaming machines in Ontario may derive from problem gamblers'. A very large proportion, possibly even a majority, of the absolute consumption of EGM gambling – whether measured as time or money spent in gaming activity – comes from problem gamblers or those at-risk. It is this nexus between problem gambling, private profit and public revenue that is the real core of contemporary gaming machine regulation issues.

Three years after the Productivity Commission's (1999) analysis of Australia's gambling industry, the PC Chairman Gary Banks stated that "[r]egulation was found to be driven mainly by revenue-raising and probity considerations, rather than the more fundamental objectives of consumer protection and amelioration of social costs" (Banks 2002, 8). Revenue raising and probity are both goals that are technologically driven in the EGM gambling sector. Yet recent research by the South Australian Centre for Economic Studies (SACES 2005) reviewed harm minimisation policies and results, and found that

> [t]he most obvious gap in our view is that industry regulators and government are lagging well behind technological advances and growth strategies pursued by a highly sophisticated machinery design industry, and are failing to utilise the very same technologies to address the social and economic impact of problem gambling (SACES 2005, 51).

EGM markets are a technically mediated form of commodity consumption. Technical regulation of revenue protection and probity aspects of the EGM industry has been comprehensively enabled through the technological transformation of the sector. However, there is no comprehensive strategy for the responsible provision of EGM gambling that utilises the CIT base on which the industry operates in the interests of consumer safety, as is the case in relation to revenue protection and probity.

In consultation with EGM manufacturers, the National Standards Working Party (NSWP) has been working toward the standardisation of requirements for the evaluation of gaming machines since 1994, within the limitations imposed by differing industry structures and technological capabilities between the participating jurisdictions. The exclusion of the legislated goal of responsible gambling into the NSWP deliberations is highlighted in the National Standards document statement of intent (Section 1.3), which states:

> The intent of this document is to ensure that gaming occurs on gaming machines in a manner that is:
> a) fair;
> b) secure; and
> c) auditable;
> and that gaming machines are reliable in terms of these issues (NS 2004, 13).

Nevertheless, regulators have in some cases commenced incorporating the responsible gambling goal of regulation into the technical standards. Relevant sections in the Victorian Appendix, for example, contain responsible gambling provisions relating to the presentation, operations and other aspects of EGM technology. The South Australian *Appendix 5.0* refers to the Game Approval (Gaming Machine) Guidelines 2003, which require the assessment of any new game features or characteristics "likely to lead to an exacerbation of problem gambling". The regulation of EGM gambling as technical practice can thus be argued to be increasingly concerned with responsible gambling, problem gambling and harm minimisation issues.

A variety of responsible gambling and harm minimisation strategies have been adopted. Technological or technical interventions aimed at reducing social costs from EGM gambling have been put in place in Victoria.[6] These include:

- a ban on $100 note acceptors on machines;
- prohibiting the increase of machine spin rates above current levels (2.14 seconds);
- a ban on autoplay facilities;
- setting a maximum bet limit of $10; and
- displaying information about the odds of winning and the amount of time and money spent by the player.

In 2006, the Victorian Government announced a revised policy as part of its successful re-election campaign (Victoria 2006). When enacted these measures will:

- reduce the maximum bet from $10 to $5;
- reduce the bank note 'load-up' limit from $9,949 to $1,000; and
- limit the amount which may be withdrawn from venue based ATMs to $400 per day

Future plans for technology-based harm minimisation measures include the introduction of a limited number of machines (up to 10% of the total number of EGMs) to which access is restricted by use of a smart card or personal identification number (PIN). However, whilst counsellors have indicated lower levels of problem gambling in states without bank note

[6] Gaming Legislation (Amendment) Act 2002, for all EGMs introduced after 1 January 2003.

acceptors on BNAs (SACES 2005), there is to date little documented evidence of the impact of changed machine characteristics and/or technical parameters on actual EGM gambling behaviour. This appears to be due to both strategic and operational shortfalls in this area. Australian regulators do not compile or analyse EGM central monitoring and control systems (CMCS) data for consumer safety or responsible gambling purposes, nor do they model EGM performance or player behaviour using such data. Data captured by commercial operators via loyalty programs also include individual gambler consumption and gambling session characteristics, but these data are not used to inform regulators, for research or for other strategic purposes.

Commercial gambling operators in Australia are increasingly compiling such detailed data on large numbers of EGM gambling customers. For example, Tabcorp's R&R loyalty program had 180,000 members and 120 venues online by the end of 2006 (Tabcorp 2007). There are a number of implications of the collection of this consumer data, some of which can be seen as opportunities and others as risks. Loyalty programmes imply a duty of care. Markets will increasingly need to factor in the future costs and risks associated with problem gambling. For example, in Canada, in response to adverse risk assessments, systems are in development that can process such data, using algorithms to enable gaming operators to monitor and gain early warnings of gambling behaviour that conforms to a problematic profile (Schellink & Schrans 2006). The collation of sophisticated data on EGM gambling behaviour will thus increasingly be seen as requiring proactive and exemplary action on behalf of gaming operators in relation to problem gambling. For regulators, that would leave unresolved the question of how to best protect consumers who gamble outside loyalty programs and about whom much less can be known.

1.5 Overview of the Report

Section 2 of this report addresses some matters derived from examination of gambling and other data provided by the Office of the Liquor and Gambling Commissioner. Section 3 reports results of a telephone survey conducted for the project. In Section 4 we report in some detail the qualitative research undertaken with the 64 problem gamblers who participated in the research via the Break Even service network. The findings of the research are then summarised in the concluding section of the report. A literature review relating to certain aspects of the research is contained at Appendix C.

2. Comparative EGM performance in South Australia

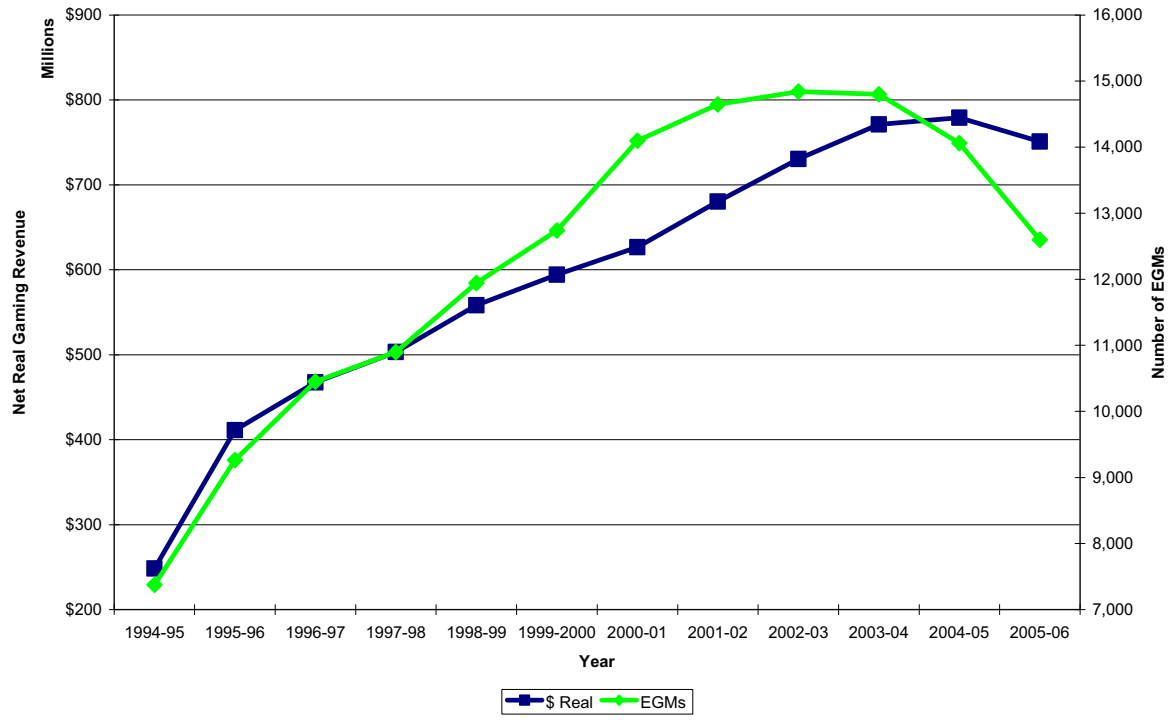
2.1 Broad parameters of EGM gambling in South Australia – comparison and interpretation

Electronic gaming machines (EGMs) were introduced into South Australia via legislation enacted in 1992. The number of EGMs deployed at local venues steadily increased between their introduction and late 2004. In September of that year a total of 14,855 EGMs were 'live'. From July 2005 a policy of reducing the number of EGMs in local venues was implemented. This initially lead to a reduction from 14,062 live EGMs in June 2005 to a total of 12,645 in July 2005, a reduction of 2,210 from the high point of the previous September. A series of trading rounds proposed to further reduce EGM numbers by a cumulative total of 3,000. The first such trading round was held on 11 May 2005 resulting in the offering for sale of 169 gaming machine entitlements, of which 42 were withheld from the pool and 127 distributed for purchase. A second trading round was held on 21 September 2005 and 75 entitlements were offered for sale, 19 of which were withheld from the pool. A third trading round is to be held on 16 April 2007. The number of EGMs operating in South Australia as at the end of March 2007 was 12,598 representing a reduction in EGM numbers of 2,257 from the high point of September 2004 (see OLGC Bulletins, 20 May 2005, 17 June 2005, 24 June 2005, 18 October 2005, 16 Jan 2007, and OLGC Quarterly Statistics (Statewide) 2003/2004, 2004/2005, 2005/2006, 2006/2007).

Ownership and operation arrangements for EGMs differ between Australian jurisdictions. In South Australia, EGMs are owned and operated by venues, and all EGMs are connected to and monitored by a statewide monitoring system operated by a third party.

The socio-economic characteristics related to the distribution of EGMs in South Australia have been well described by Delfabbro (2002). However, the pattern of distribution recounted by Delfabbro (2002) can be seen to be broadly consistent with patterns found in NSW and Victoria (AIPC 2006; Marshall and Baker 2002; Livingstone 2001); that is, there is a strong positive correlation at local level between the relative concentration of EGMs (measured on a per capita basis) and relative socio-economic disadvantage. There is a similar strong correlation between the quantum of per capita EGM expenditure and relative socio-economic disadvantage. Thus, EGMs tend to be concentrated in areas of socio-economic disadvantage and generate much of their revenue from those areas, given that there is a further strong relationship between the density of EGMs and per capita consumption of EGMs. Revenue generated by and thus taxes levied on EGM consumption within jurisdictions where this pattern of EGM distribution is experienced are therefore likely to conform to a pattern of being regressive in nature (Smith 1999).

Figure 2.1: Real EGM consumption and total number of EGMs, South Australia, June 1994-95 to 2005-06 ($2006)



Sources: OLGC SA, ABS

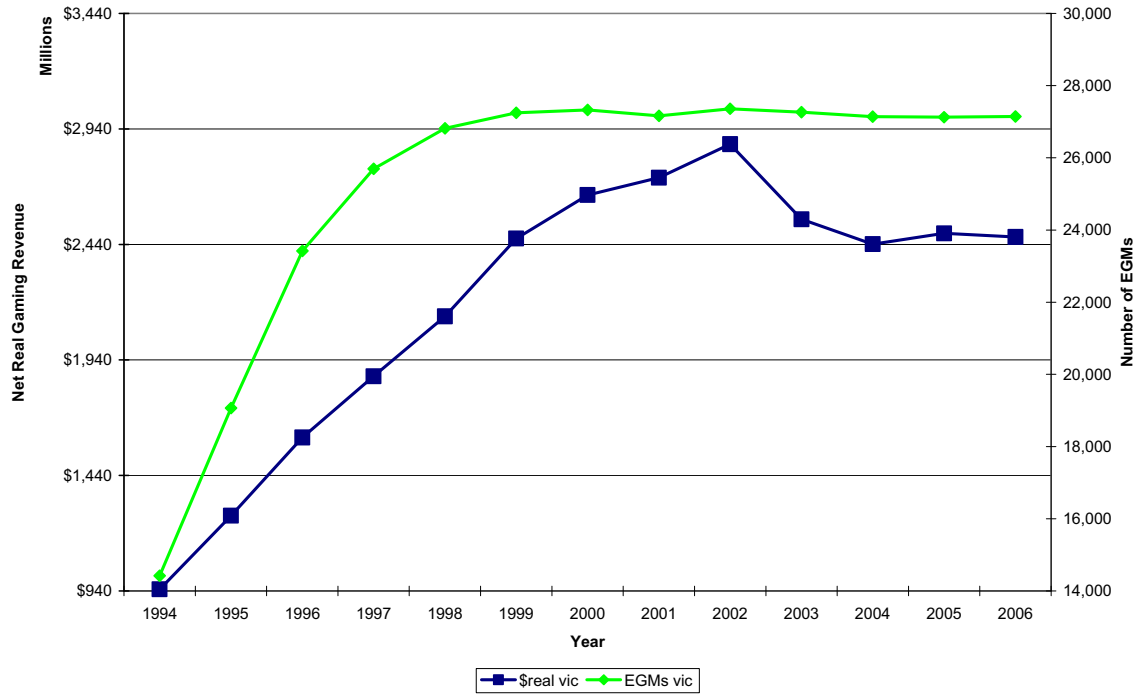
Figure 2.1 sets out the pattern of growth in the total number of EGMs operated in South Australia and in the total real value of consumption.[7] It is clear that trends in real EGM consumption appear to have generally paralleled trends in the number of EGMs in operation. However, growth in the number of EGMs has not always been matched by identical growth in real consumption. Further, the proportional reduction in EGM numbers commenced in mid-2005 was not matched by a similarly proportional decline in real consumption. Nonetheless, the Pearson product moment correlation (r) for this relationship is 0.933, indicating a strong positive relationship. This echoes patterns generally observable in other jurisdictions. The early years of the deployment of EGMs in Victoria, for example, shows a similar pattern, although this is less clear in the later years of the series, as demonstrated by Figure 2.2. Nonetheless, the Pearson (r) value for these data is 0.918, demonstrating a very robust relationship. A range of factors may account for the differing patterns of growth in EGM numbers and real EGM consumption during various phases of EGM deployment in South Australia and Victoria. These include the market structure, the regulation and practice of EGM marketing and promotions, and the application and operation of other technical and regulatory factors as bank note acceptors and smoking bans.

For example, the market structure of the local EGM industry in Victoria is quite distinct from that prevailing in South Australia, with duopoly operators each owning half of the State's 27,500 EGM 'entitlements' (to adapt the South Australian terminology), operating their own Central Control and Monitoring System, and thus being in a position to exert considerable,

[7] In this report the authors utilise the term 'consumption' to describe the net monetary value of EGM utilisation. Unless otherwise advised, this is expressed in real terms using 2005-06 values deflated by the ABS CPI for Australia (ABS 6401.1)

and very well informed, influence over marketing and operational issues with venue operators (who enter into agreements with the duopolists to operate EGMs within their venue). Notwithstanding these differences, the availability of comparable data means that some comparison between the two markets may assist in highlighting important factors associated with the pattern of growth in EGM consumption, including the relevant importance of EGM technical issues such as the deployment of particular games and game features and their relative 'efficiency'.

Figure 2.2: Real EGM consumption and total number of EGMs, Victoria, June 1994 to June 2006 ($2006)



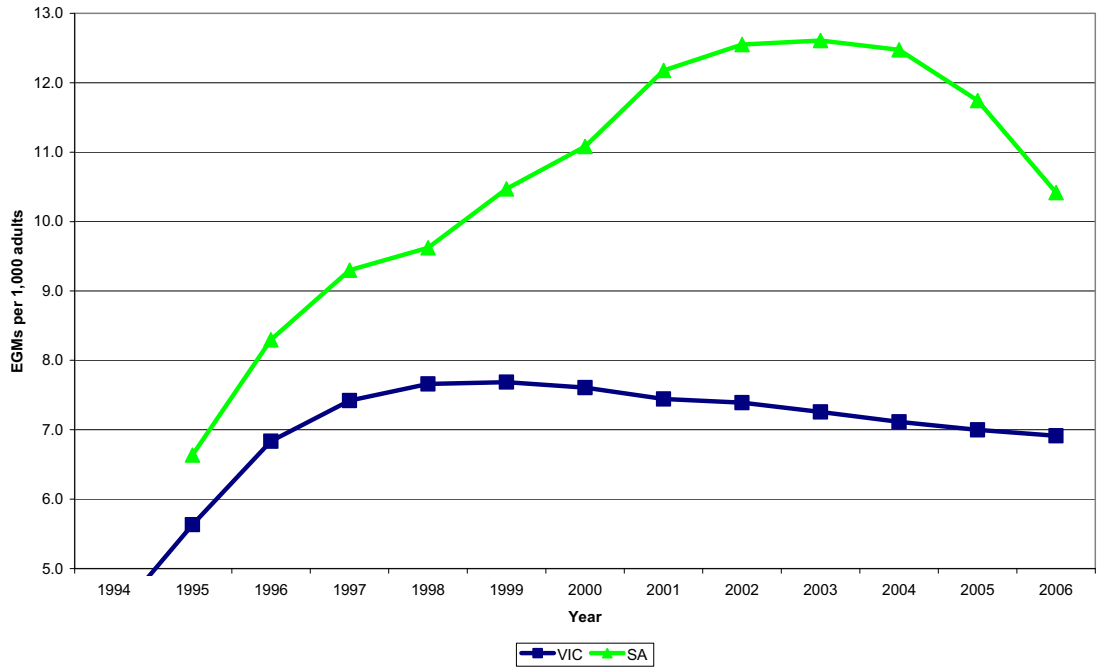
Sources: OGR (Vic), ABS

Real growth in EGM consumption may result from increased numbers of EGMs relative to population (i.e., increased 'density' of EGMs), increases in EGM utilisation, or increased average consumption of EGMs during individual sessions of use. In turn, certain of these conditions may be affected by demographic or economic change (for example, increased population and continuing or improving economic circumstances) or via 'intensification' of EGM operation (i.e., enhanced marketing and improved operational efficiency of EGMs and venues). It seems most likely that a combination of these factors has fuelled growth in EGM consumption in Australian jurisdictions. However, at different times during the 'short history' of legalised EGMs in South Australia and Victoria (for example) different factors may have contributed more or less to the pattern of growth in EGM consumption.

For example, during the 'roll-out' or early growth phase in both Victoria and South Australia, data displayed in Figures 2.1 and 2.2 may suggest that growth in EGM numbers was a key factor supporting growth in real EGM consumption. This seems likely in South Australia over the period from 1994 to 2005, and in Victoria between 1994 and 2000. In Victoria, growth in EGM consumption was constrained to a certain degree by a more limited availability of

EGMs after the introduction of a global cap in EGM numbers in the late 1990s. Figure 3.3 compares the density of EGMs in Victoria and South Australia over the relevant period.

Figure 2.3: EGMs per 1,000 adults, Victoria and South Australia, June 1995 to June 2006



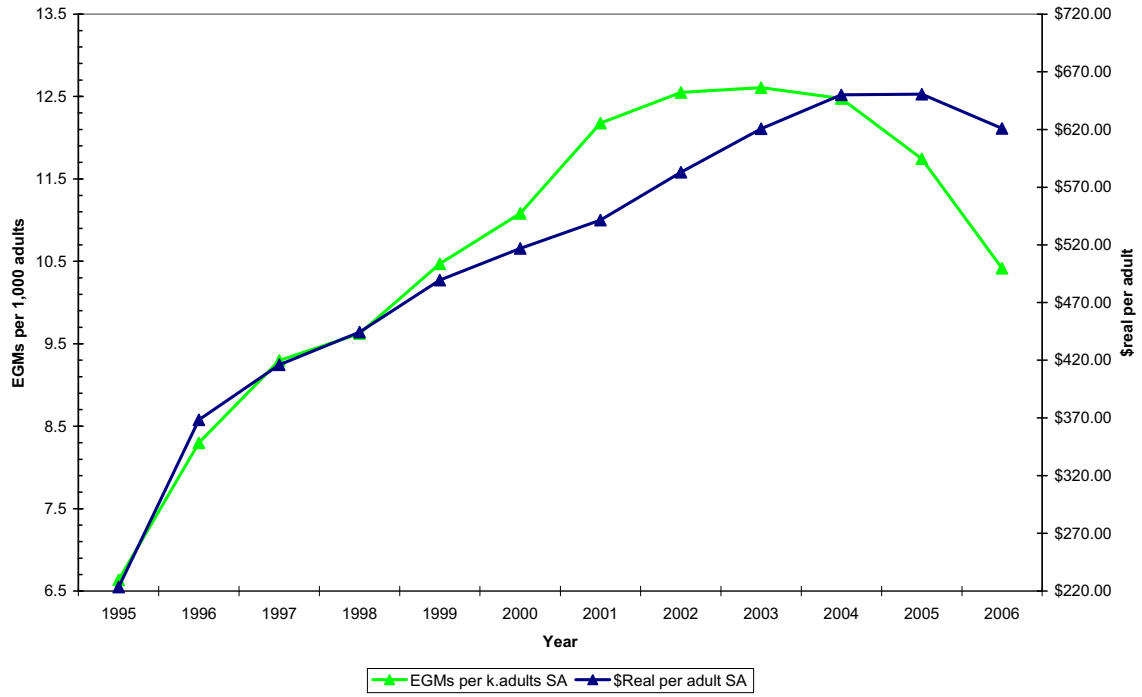
Sources: OLGC (SA), OGR (Vic), ABS

As Figure 2.3 demonstrates, EGM density in Victoria reached a peak in 1998-1999, and subsequently declined as population grew slightly but EGM numbers remained almost unchanged. In South Australia, EGM densities continued to grow relatively strongly until they reached a peak in 2003, and as already noted declined substantially after 2004 following the legislated reduction in EGM numbers implemented in mid-2005.

Figures 2.4 and 2.5 display data describing EGM density and EGM consumption per adult in South Australia and Victoria respectively, and Figure 2.6 combines data on EGM density and consumption per EGM in both states.

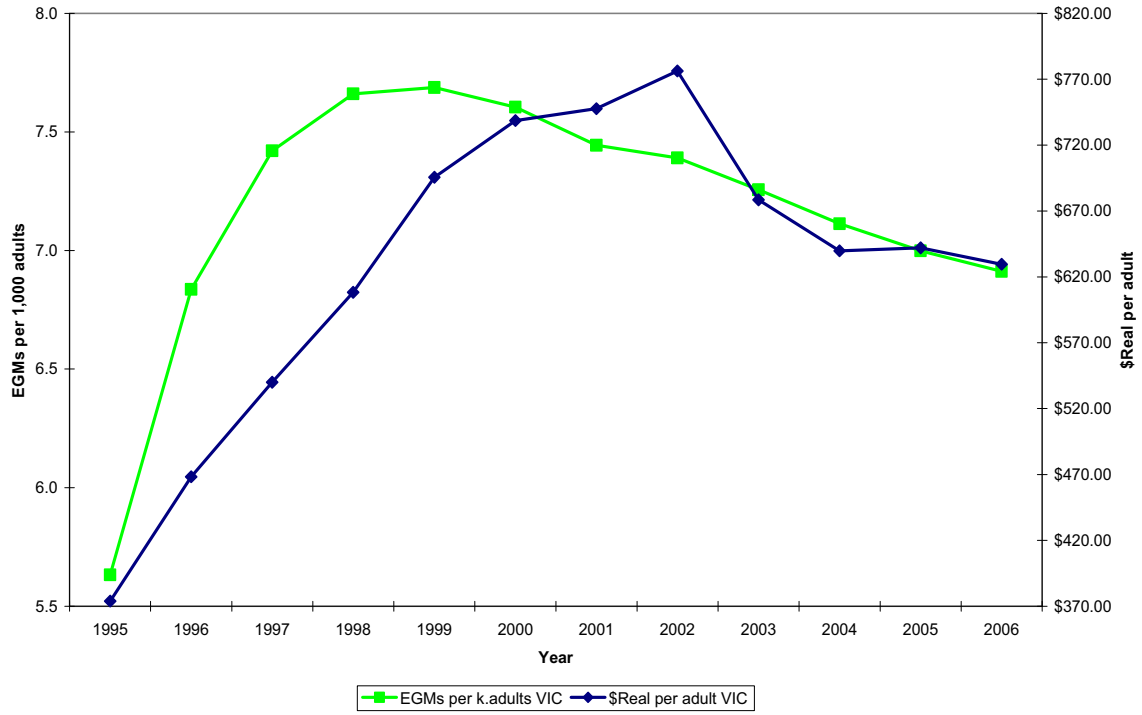
In South Australia, growth in EGM density was accompanied by growth in real per capita consumption of EGMs until after growth in EGM numbers ceased in 2002 and 2003. After that period, there was an observable decline in per capita EGM consumption. In Victoria, growth in EGM densities was also accompanied by growth in real per capita consumption of EGMs which continued well past the point (around 1999) when EGM density began to decline, until it was seemingly interrupted by the imposition of venue 'smoking bans' in 2002.

Figure 2.4: EGMs per 1,000 adults and real EGM consumption per adult, South Australia, June 1995 to June 2006 ($June 2006)



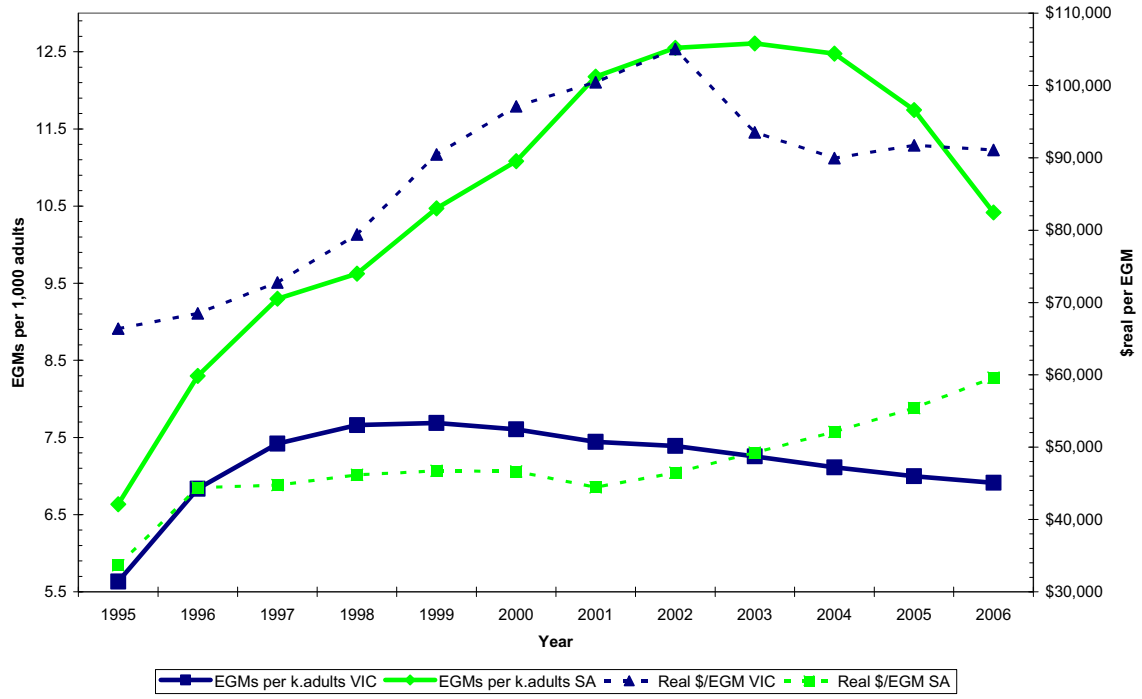
Sources: OLGC (SA), OGR (Vic)

Figure 2.5: EGMs per 1,000 adults and real EGM consumption per adult, Victoria, June 1995 to June 2006 ($June 2006)



Sources: OLGC (SA), OGR (Vic), ABS

Figure 2.6: EGMs per 1,000 adults and real consumption per EGM, South Australia and Victoria, 1995 to 2006 ($2006)

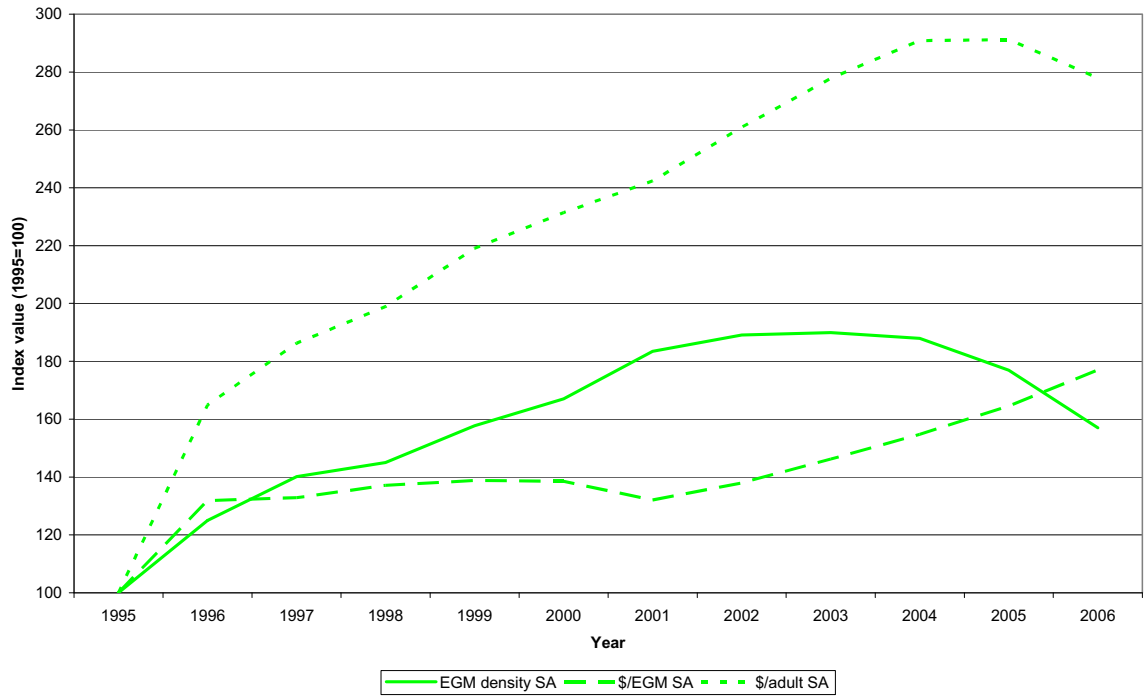


Sources: OLGC (SA), VCGR (Vic), ABS.

Figure 2.6 demonstrates that there are important differences between the performance of EGMs in the South Australian and Victorian jurisdictions, however. As EGM density grew in South Australia, between 1995 and 2002, consumption per EGM grew quickly and then plateaud until the period 2000 to 2002, after which it began to grow as EGM densities declined. In Victoria, consumption per EGM grew solidly throughout the 1990s, declined after 2002 (almost certainly as a consequence of the smoking ban) and then recovered to plateau from about 2004. Throughout most of this period EGM densities had been steadily but modestly declining as the global cap on EGM numbers after 1999 meant that a growing population eroded average EGM density.

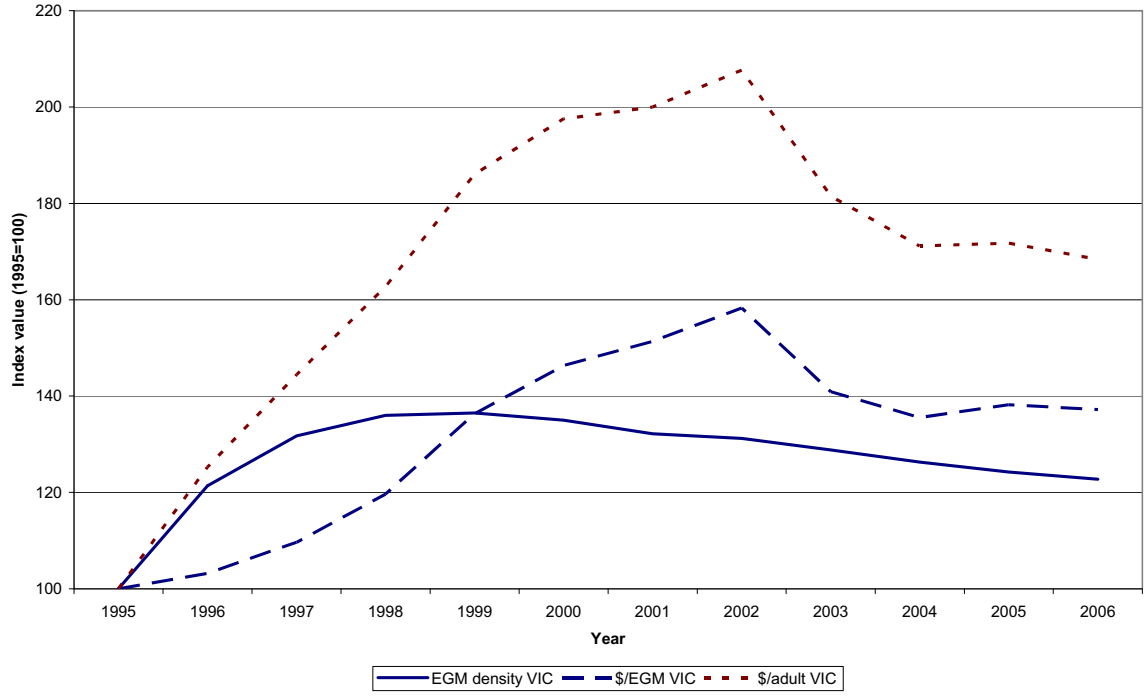
It may be useful to attempt to bring all three variables discussed above together for the sake of direct analytical comparison. Figures 2.7 and 2.8 display indexed data describing EGM density, and EGM consumption per adult and per EGM for South Australia and Victoria respectively. The display in indexed form, where data from the base year (1995) for each variable is reduced to a value of 100, and yearly values are displayed in proportion to that base value, permits more considered comparison of growth rates for these variables.

Figure 2.7: Indices of EGM density, real EGM consumption per capita and real EGM consumption per EGM, South Australia, 1995-2006



Sources: OLGC (SA), ABS

Figure 2.8: Indices of EGM density, real EGM consumption per capita and real EGM consumption per EGM, Victoria, 1995-2006



Sources: VCGR (Vic), ABS.

What figures 2.7 and 2.8 highlight is that in Victoria, growth in per capita consumption of EGMs was closely paralleled by growth in per EGM rates of consumption. In South Australia, the closest relationship appears to have been that between EGM density and real per capita EGM consumption. Simple statistical analysis bears out these observations. The values for Pearson product moment correlations (r) for each combination of these three variables are shown in Table 2.1.

Table 2.1: Pearson product moment correlations (r), EGM related variables, South Australia and Victoria, 1995-2006 and 2000-2006

	EGM density/$EGM		EGM density/$adult		$EGM/$adult	
	SA	Vic	SA	Vic	SA	Vic
1995-2006	0.58965	0.55427	0.91652	0.76848	0.85615	0.95727
2000-2006	-0.56054	0.72143	0.16806	0.88202	0.71990	0.96260

Sources: OLGC (SA), VCGR (Vic), ABS, calculations by the authors

Logistic regression analysis of these variables was also undertaken and, although inconclusive, is reported at Appendix D. However, what the present layer of analysis reveals is that between 1995 and 2006, there was a very strong apparent relationship between real consumption per EGM and real consumption per adult in Victoria. In South Australia, although this relationship was relatively robust, a more robust relationship prevailed between EGM density and EGM consumption per adult. It is slightly surprising to discover that the relationship between EGM densities and consumption per EGM was not particularly robust in either South Australia or Victoria, although in Victoria a reasonably robust correlation between these variable is observable between 2000 and 2006. This latter result may be an artefact of co-linearity, given that the decline in EGM densities had been well established without apparent impact on EGM consumption prior to the impact of the smoking ban from 2002. What is also interesting is that in South Australia the relationship between EGM density and consumption per EGM was negative after 2000, as is also clearly visible in Figure 2.7. As EGM density plateaud and then declined, consumption per EGM also plateaud and then steadily increased, although not enough to entirely offset the relatively significant decline in per capita consumption associated with the regulated decline in EGM density. Nonetheless, the relationship between EGM densities and consumption per EGM was not particularly strong.

In Victoria, what seemed to have most impact on per capita consumption over the series was the extent to which consumption per EGM changed. In South Australia, the most robust relationship was that between EGM densities and per capita consumption, even though there was also a relatively robust relationship between consumption per adult and consumption per EGM.

In South Australia, it appears that growth in EGM numbers was accompanied by strong growth in per capita consumption but little growth in consumption per EGM until about 2001. After that, declining growth, a plateauing, and then eventual decline of EGM density was offset by steady growth in consumption per EGM to produce continuing growth in per capita consumption, until the point at which EGM reductions had a solid if disproportionate impact on per capita consumption of EGMs. (EGM density in South Australia declined 16.5% between June 2004 and June 2006, whereas real per capita consumption declined by 4.5%. In

Victoria, EGM density declined by about 2.8% and per capita consumption by about 1.6% over the same period).

Thus, we can observe two phases of EGM growth. The first is supply driven, where increasing EGM numbers appeared to stimulate growth in per capita consumption. Subsequently, growth in EGM consumption appears to be related to 'intensification' of EGM use, in which increasing average consumption per EGM becomes an increasingly important element of per capita consumption growth. In Victoria, although a similar pattern of growth is also clear, the growth due to 'intensification' – that is, growth in EGM consumption per EGM - appears to have been more pronounced.

We believe these data demonstrate that growth in EGM consumption per capita is probably fuelled by different factors at different periods in the 'short history' of EGM development.

There are many possible factors that can contribute to the relative 'intensity' of EGM use, measured by the value of average consumption per EGM. These include: EGM game/platform characteristics, configuration and features (including such features as bank note acceptors, game characteristics, and parameter settings), venue characteristics (including venue location, in-venue incentives, marketing tactics, and operating hours), ownership and control characteristics (including capacity of operators to concentrate particular EGM games in areas of maximum consumption, and to make centralised marketing decisions), socio-demographic and socio-economic factors, and the relative availability of EGMs and venues.

There is some evidence (see Dickerson 2007; Livingstone 2001) that access and availability are the most important factors fuelling EGM consumption, and that inserting EGMs into new locations will expand consumption rather than redistribute it. This would tend to support the hypothesis that increases in the supply of EGMs will generally be associated with increased consumption overall. This is broadly supported by research evaluating the impact of 'regional caps' in EGM numbers in Victoria (SACES 2005) which demonstrated that relatively modest reductions in EGM availability had no discernible impact on consumption of EGM gambling, since even at relatively low average EGM densities, EGMs are not fully utilised other than for very brief periods during a weekly cycle.[8] However, there is also some evidence that technological development in EGM game and platform design as well as in marketing and control arrangements will have a significant impact on the level of per capita consumption of EGMs. The classic four 'P' – product, price, promotion and place – operate in EGM markets of course, but it is likely that product characteristics are less well understood by consumers and regulators than is the case in some other markets.

2.2 Data relating to high performance EGM games

The Office of the Liquor and Gambling Commissioner (OLGC) provided data describing characteristics of the 250 'highest' performing EGMs in 2004-05 and 2005-06, in terms of net gaming revenue. These data included the 'game set', date of installation of the EGM in South Australia, manufacturer, and net gaming revenue (NGR) for the relevant year. These data were analysed to identify if there were any particular EGM games that appeared as prominent amongst these EGMs. Tables 2.2 and 2.3 set out details of this analysis.

[8] This was verified during discussions with gaming venue operators reported in AIPC (2006).

Table 2.2: Details of 'Top 250' EGM games, South Australia, 2004-05 (nominal dollars)

Game Name	N	NGR	NGR/EGM	% N	% $	Manufacturer
Adonis	11	$1,894,971	$172,270	4.4%	4.1%	Aristocrat
Black Rhino	1	$213,024	$213,024	0.4%	0.5%	Aristocrat
Choy Sun Doa	3	$653,002	$217,667	1.2%	1.4%	Aristocrat
Dolphin Treasure	39	$6,684,483	$171,397	15.6%	14.4%	Aristocrat
Enchanted Forest	2	$319,695	$159,848	0.8%	0.7%	Aristocrat
Geisha	6	$977,362	$162,894	2.4%	2.1%	Aristocrat
Incan pyramid	3	$486,826	$162,275	1.2%	1.0%	Konami
Indian dreaming	65	$11,850,124	$182,310	26.0%	25.4%	Aristocrat
Jewel of Arabia $50-100	4	$666,162	$166,540	1.6%	1.4%	IGT
King of the Nile	1	$156,663	$156,663	0.4%	0.3%	Aristocrat
Major Money in the Lost Civilisation	1	$157,759	$157,759	0.4%	0.3%	IGT
Major Money in the Outback Adventure	1	$155,899	$155,899	0.4%	0.3%	IGT
Mega Bucks	6	$1,133,067	$188,845	2.4%	2.4%	IGT
Mystic Jaguar	1	$157,138	$157,138	0.4%	0.3%	IGT
Mystic Mermaid	3	$512,195	$170,732	1.2%	1.1%	Aristocrat
Mystic Tiger	1	$180,323	$180,323	0.4%	0.4%	AGT
Owl Capone	3	$658,685	$219,562	1.2%	1.4%	Aristocrat
Peacock flutter	1	$168,466	$168,466	0.4%	0.4%	Aristocrat
Phantom Pays	1	$244,212	$244,212	0.4%	0.5%	Aristocrat
Pompeii	1	$159,721	$159,721	0.4%	0.3%	Aristocrat
Reelin N Rockin	1	$173,501	$173,501	0.4%	0.4%	Aristocrat
Shogun	41	$8,543,852	$208,387	16.4%	18.3%	IGT
Shogun 2	47	$9,204,257	$195,835	18.8%	19.8%	IGT
Spring Carnival	5	$889,642	$177,928	2.0%	1.9%	Aristocrat
Super Bucks 3	2	$325,945	$162,972	0.8%	0.7%	Aristocrat
TOTALS	**250**	**$46,566,976**	**$186,268**			
TOP FOUR	***192***	***$36,282,716***	***$188,972***	***76.8%***	***77.9%***	

Source: OLGC (SA)

In both the years for which data was obtained, four EGM games were clearly pre-eminent amongst the most successful EGMs in the South Australian marketplace. These were Indian Dreaming (65 EGMs in 'top 250' in 2004-05, and 55 in 2005-06) Shogun 2 (47 and 100), Shogun (41 and 34) and Dolphin Treasure (39 and 22). The next most commonly occurring EGM game was Adonis (11 in 2004-05 and 4 in 2005-06). No other EGM game appeared in the 'top 250' more than 6 times in 2004-05 or more than 3 times in 2005-06. The four most commonly occurring games in this group collectively accounted for 76.8% of the number of EGM games in the top 250 in 2004-05 and 84.4% in 2005-06. These games also accounted for 77.9% of NGR for the 'top 250' in 2004-05 and 86.5% in 2005-06. In terms of manufacturers, games produced by the manufacturer Aristocrat Leisure Ltd (Aristocrat) accounted for 145 (68%) of the top 250 games in 2004-05 and 107 (42.8%) in 2005-06. Games manufactured by International Gaming Technologies (IGT) accounted for 101 (40.4%) of the 'top 250' in 2004-05 and 138 (55.2%) in 2005-06.

Table 2.3: Details of 'Top 250' EGM games, South Australia, 2005-06 (nominal dollars)

Game Name	N	NGR	NGR/EGM	% N	% $	Manufacturer
Adonis	4	$768,520	$192,130	1.6%	1.4%	Aristocrat
Black Rhino	2	$376,189	$188,094	0.8%	0.7%	Aristocrat
Blue Moon 3	1	$179,186	$179,186	0.4%	0.3%	Aristocrat
Choy Sun Doa	2	$387,697	$193,848	0.8%	0.7%	Aristocrat
Dolphin Treasure	22	$4,361,339	$198,243	8.8%	7.7%	Aristocrat
Dragons Tale	1	$182,070	$182,070	0.4%	0.3%	Aristocrat
Enchanted Forest	1	$206,455	$206,455	0.4%	0.4%	Aristocrat
Fort Knox	1	$187,749	$187,749	0.4%	0.3%	Aristocrat
Geisha	1	$184,081	$184,081	0.4%	0.3%	Aristocrat
Incan Pyramid	3	$566,999	$189,000	1.2%	1.0%	Konami
Indian Dreaming	55	$10,948,291	$199,060	22.0%	19.2%	Aristocrat
Jewel of Arabia $50-$100	4	$781,283	$195,321	1.6%	1.4%	Aristocrat
King of Diamonds	2	$371,468	$185,734	0.8%	0.7%	IGT
King of the Nile	1	$184,366	$184,366	0.4%	0.3%	Aristocrat
King Pin	2	$422,947	$211,474	0.8%	0.7%	Aristocrat
Kung Fu	1	$235,004	$235,004	0.4%	0.4%	Aristocrat
Mega Bucks	2	$467,805	$233,903	0.8%	0.8%	IGT
Mystic Mermaid	2	$395,392	$197,696	0.8%	0.7%	Aristocrat
Mystic Tiger	1	$216,954	$216,954	0.4%	0.4%	AGT
Peacock Flutter	1	$209,689	$209,689	0.4%	0.4%	Aristocrat
Phantom Pays	1	$222,735	$222,735	0.4%	0.4%	Aristocrat
Shogun	34	$7,543,142	$221,857	13.6%	13.3%	IGT
Shogun 2	100	$26,350,128	$263,501	40.0%	46.3%	IGT
Spring Carnival	3	$538,542	$179,514	1.2%	0.9%	Aristocrat
Super Bucks 3	1	$227,449	$227,449	0.4%	0.4%	Aristocrat
The Big Buck	1	$191,541	$191,541	0.4%	0.3%	Pacific
Where's the Gold	1	$183,595	$183,595	0.4%	0.3%	Aristocrat
TOTALS	**250**	**$56,890,613**	**$227,562**			
TOP FOUR	***211***	***$49,202,900***	***$233,189***	***84.4%***	***86.5%***	

Source: OLGC (SA)

Tables 2.4 and 2.5 set out summaries of relevant data for the top four games, and other 'top 250' games, for 2004-05 and 2005-06 respectively.

Table 2.4: Average data and characteristics, four most prominent EGM games in 'top 250' and others, South Australia, 2004-05

EGM game	Average Credit value (cents)	Average age of game at 30 June 2005 (years)	N	Average NGR	%N top 250	%N all EGMs	%$ top 250
Indian Dreaming	7.35	5.0	65	$182,310	26.0%	6.0%	25.4%
Shogun 2	100.00	2.8	47	$195,835	18.8%	2.0%	19.8%
Shogun	100.00	6.2	41	$208,387	16.4%	1.7%	18.3%
Dolphin Treasure	9.69	7.9	39	$171,397	15.6%	17.4%	14.4%
Sub-total	50.29	5.3	192	$188,972	76.8%	27.1%	77.9%
Others	27.91	4.7	58	$177,315	23.2%	-	
TOTAL	45.10	5.2	250	$186,268	100.0%	-	

Source: OLGC (SA)

Table 2.5: Average data and characteristics, four most prominent EGM games in 'top 250' and others, South Australia, 2005-06 (nominal dollars)

EGM game	Average Credit Value (cents)	Average age of game at 30 June 2006 (years)	N	Average NGR	%N top 250	%N all EGMs	%$ top 250
Shogun2	100.0	4.6	100	$263,501	40.0%	3.2%	46.3%
Indian Dreaming	1.4	5.9	55	$199,060	22.0%	8.2%	19.2%
Shogun	100.0	7.1	34	$221,857	13.6%	1.8%	13.3%
Dolphin Treasure	2.9	9.1	22	$198,243	8.8%	15.7%	7.7%
Sub total	**64.2**	**5.8**	**211**	**$233,189**	**84.4%**	**1.7%**	**86.5%**
Others	28.2	5.3	39	$197,121	15.6%		13.5%
Total	**58.5**	**5.7**	**250**	**$227,562**	**100.0%**		**100.0%**

Source: OLGC (SA)

The average credit value for the four most prominent games in the 'top 250' in 2004-05 (i.e., the value of a single credit for play on the relevant game) was $1.00 for Shogun and Shogun 2, and for Indian Dreaming and Dolphin Treasure $0.074 and $0.097 respectively. In 2004-05 a small number of higher denomination Indian Dreaming and Dolphin Treasure games appeared in the 'top 250', skewing the average credit value somewhat. In that year, the 'top 250' data provided by the OLGC indicated that there were 44 Indian Dreaming games of 1c credit value, 17 of 2c credit value and 4 of $1 credit value. For Dolphin Treasure, there were 15 games of 1c credit value, 14 of 2c credit value, 7 of 5c credit value and 3 of $1 credit value. The average value of NGR for the four most prominent games in the 'top 250' was $208,387 and $195,835 for Shogun and Shogun 2 respectively, whereas Indian Dreaming and Dolphin Treasure averaged NGR of $182,310 and $171,397. Average NGR and other data relating to game credit value for these games is also shown in Table 2.6.

Table 2.6: Credit value and NGR of Dolphin Treasure and Indian Dreaming games in 'top 250',South Australia, 2004-05

Game	Credit value	Number in Top 250	Average NGR
Dolphin Treasure	$0.01	15	$173,007
"	$0.02	14	$169,477
"	$0.05	7	$168,978
"	$1.00	3	$177,951
Indian Dreaming	$0.01	44	$179,648
"	$0.02	17	$189,253
"	$1.00	4	$182,071

Source: OLGC (SA)

In 2005-06, the average credit values for the four most prominent games amongst the 'top 250' were $1.00 for Shogun and Shogun 2 (all Shoguns were of $1.00 credit value), and for Indian Dreaming and Dolphin Treasure, $0.014 and $0.029 respectively. In 2005-06 the data indicate that there were 35 Indian Dreaming games of one cent credit value and 20 of two cent credit value amongst the 'top 250' games. For Dolphin Treasure, there were 8 games of one cent credit value, 5 of two cent credit value and 9 of five cent credit value. The average value of NGR for the four most prominent games in the 'top 250' in 2005-06 was $221,857 and $263,501 for Shogun and Shogun 2 respectively, whereas Indian Dreaming and Dolphin Treasure games averaged NGR of $199,060 and $198,243 respectively. Average NGR and other data relating to game credit value for these games is also shown in Table 2.7.

Table 2.7: Credit value and NGR of Dolphin Treasure and Indian Dreaming games in 'top 250',South Australia, 2005-06

Game	Credit value	Number in Top 250	Average NGR
Dolphin Treasure	$0.01	8	$197,174
"	$0.02	5	$194,374
"	$0.05	9	$201,342
Indian Dreaming	$0.01	35	$194,765
"	$0.02	20	$206,575

Source: OLGC (SA)

The 'best' performing EGM in terms of net gaming revenue in the South Australian network in 2004-05 was a Shogun 2, first installed in South Australia in December 2001, which generated NGR of $410,506. The second 'best' performing game was another Shogun 2 installed in October 2002, which generated NGR of $314,746. Nine of the 'top ten' EGMs in South Australia in that year were either Shogun or Shogun 2, all of which were $1.00 credit value. The average NGR for these EGM games was in excess of $296,337.

In 2005-06, the highest returning EGM was a Shogun 2 first installed in December 2001, which generated NGR of $478,913. This EGM was installed in the same venue as was the best performing EGM from the previous year. The second highest returning game was another Shogun 2 in the same venue also installed in December 2001, which generated NGR of $478,269. All 'top ten' EGMs in 2005-06 were Shogun 2 games, all of which were $1 credit value (all Shogun and Shogun 2 games in the 'top 250' operated with $1 credit value). The average NGR of these 'top ten' games was $387,867.

In 2004-05, 18 of the 'top 20' EGMs were $1 credit value, as were 36 of the 'top 50' and 60 of the 'top 100'. Amongst the EGMs ranked from 101 to 200 (the 'second 100'), 33 were $1 credit value. In 2005-06, all of the 'top 50' EGMs were $1 credit value, as were 87 of the 'top 100'. Of the 'second 100' ranked EGMs, 46 were $1 credit value.

In 2004-05, there were 73 venues operating at least one of the 'top 250' performing EGM games. One venue operated 15 such games generating (from those EGMs only) aggregate NGR of about $2.8 million. Seven venues operated 10 or more such games, and the average number of 'top 250' games installed in these venues was 3.4. In 2005-06, there were 87 venues operating at least one 'top 250' game, with one venue operating 14 such games generating aggregate NGR (from those EGMs only) of about $2.9 million. Four venues operated 10 or more such games, and the average number of 'top 250' games installed in these venues was 2.9.

The OLGC kindly provided data demonstrating that the average bet sizes for one cent and two cent credit value Indian Dreaming games for 2005-06[9] were 50 cents and 79 cents respectively. Average bet values for Shogun and Shogun 2 games, all of which were $1.00 credit value, were $3.01 and $3.04 respectively. Average bet sizes for one cent Dolphin Treasure games were either 33 cents or 43 cents (depending on line configuration), for 2 cent games either 47 cents or 64 cents, and for 5 cent credit value games either 77 cents or $1.18.

[9] The OLGC advised that the data provided related to the week ending 26 June 2006, and were "indicative of the figure for the full financial year of 2005-06".

Amongst the four 'top performing' EGM games in 2005-06, the average bet size for one dollar credit value games was thus a little more than three times credit value. In comparison, the average bet size for games of one cent credit value was between 33 and 50 times credit value, two cent credit value games had average bet sizes of between 23.5 and 38.5 times credit value, and five cent games average bet sizes between 15.4 and 23.6 times credit value. These data appear to reflect the 'mini-max' strategy favoured by many gamblers (notably including problem gamblers, as noted in Section 4 of this report). Utilisation of small credit value games allows gamblers to maximise the number of lines they bet on and presumably provides greater capacity to periodically increase the number of credits wagered. Both of these tactics are preferred by many gamblers, especially problem gamblers (AIPC 2006), and the design of EGM games is such that even the lowest credit value games are able to generate substantial NGR through average bets that are large multiples of the available minimum. Games of one dollar credit value are clearly expensive to play and accordingly are relatively likely to limit the utilisation of a mini-max strategy. Although the very highest performing games in South Australia in both of the years for which we obtained data were overwhelmingly of one dollar credit value, very substantial NGR was generated by games of one cent or two cent credit value – in 2004-05, for example, a Choy Sun Doa game of one cent credit value was the highest ranking one cent game, ranked sixth overall with NGR of $272,061. In 2005-06, an Indian Dreaming game of one cent credit value was the highest ranking one cent game, ranked 61st overall with NGR of $254,139.

If average bet sizes, theoretical RTP and average NGR are known for each of the four 'top performing' games, it may be possible to calculate the 'theoretical' turnover and theoretical utilisation rate (the number of spins, or button pushes) averaged by each of those of the four games appearing in the 'top 250'. The theoretical turnover for each of the games was calculated using the following simple equation:

$$\text{TTO} = \frac{ANGR}{(1 - TRTP)}$$

where TTO is theoretical turnover, ANGR is average net gaming revenue for the selected game, and TRTP is the weighted average theoretical RTP for the selected game per credit value category.

On this basis the theoretical average utilisation rates for the 'top four' games were calculated, as set out in table 2.8.

Table 2.8: Estimation of theoretical utilisation rates for four most prominent EGM games in 'top 250', South Australia, 2005-06

					Average bet		Average spins (N)	
Game	TRTP	Cred Val	Average NGR	TTO	Low	High	Low	High
Dolphin Treasure	87.87%	$0.01	$197,174	$1,625,508	$0.33	$0.43	4,925,783	3,780,252
	87.87%	$0.02	$194,374	$1,602,420	$0.47	$0.64	3,409,405	2,503,781
	89.23%	$0.05	$201,342	$1,868,699	$0.77	$1.18	2,426,882	1,583,644
Shogun	92.75%	$1.00	$221,857	$3,060,098	$3.01	-	1,016,644	-
Shogun 2	92.75%	$1.00	$263,501	$3,634,500	$3.04	-	1,195,559	-
Indian Dreaming	89.80%	$0.01	$194,765	$1,909,144	$0.50	-	3,818,288	-
	89.54%	$0.02	$206,575	$1,975,283	$0.79	-	2,500,358	-

Source: OLGC SA

The estimates set out in Table 2.8 illustrate the actual consequences of the concepts of 'REVPAC' and 'TOD' as well presented and discussed in Cooper (2005). Cooper, writing from a journalistic perspective, discusses the game characteristics defined by the industry terms 'revenue per available customer' (REVPAC) and 'time on device' (TOD) as dynamic characteristics of EGM games which must be addressed in order to maximise the earnings available from EGM games. As table 2.8 demonstrates, low credit value games are likely to generate much greater aggregate TOD than high credit value games such as Shogun and Shogun 2, which generate somewhat higher average NGR (REVPAC) but appear to be much less well utilised. Low credit value games generate lower but still very significant average NGR but do so by virtue of their much greater utilisation rates – very high total TOD. In fact, the relatively small number of Dolphin Treasure games for which performance data were available, and the fact of distinct line configurations of those games, is likely to have produced a substantial degree of data volatility.[10] The maximum number of annual 'spins' calculated for one cent credit value Dolphin Treasure games suggests that the games are in use for more than 6,840 hours per year, or 380 days of constant use at 18 hours per day, with average spin rate of five seconds (i.e., 12 spins per minute). This is clearly an overestimate. Of course, average bet value on those high performing 'top 250' games could well be in excess of the overall average bet size for the game generally, which would also account for this anomaly. We also believe, however, that this is an artefact of the volatility of EGM RTP, which in South Australia is required to be assessed on the basis of 'the total amount of all bets made on the machine' (Gaming Machines Act 1992, Schedule 1, clause (n)). That is, the relationship between theoretical RTP and actual performance of EGM games is likely to exhibit substantial volatility in the case of small numbers of games over relatively short periods of time. However, despite the obvious need for more research in this area, the theoretical average utilisation rates calculated in Table 2.8 still strongly suggest that the relative success of low credit value games arises because they facilitate substantial TOD for EGM users, and that successful high credit value games are successful because of high REVPAC, despite relatively low utilisation rates compared to low credit value games. Shogun and Shogun 2 games are utilised at a rate of between one third and one half of that for Indian Dreaming games, but produce NGR between about 7.5% and 35% higher. For comparative purposes, characteristics of each of the four most prominent 'top 250' games are also set out in Table 2.9.

[10] There were eight Dolphin Treasure games of one cent credit value, five of two cent credit value and nine of five cent credit value. In contrast, there were 35 Indian Dreaming games of one cent credit value and 20 of two cent credit value. All Shogun (34) and Shogun 2 (100) games were of one dollar credit value. In Victoria, actual RTP is calculated for regulatory purposes by assessing the aggregate RTP of all EGMs operating within each particular venue during each calendar year, again in order to address issues associated with volatility of EGM performance.

Table 2.9: Four most prominent 'top 250' games, selected characteristics

Game name	Multi-line or 'ReelPower™'	Credit value	Theoretical RTP	Theoretical utilisation (Average spins p.a.)	Average bet size	Average bet as multiple of credit value
Shogun	Multi	$1	92.75%	1,016,644	$3.01	3.01
Shogun 2	Multi	$1	92.75%	1,195,559	$3.04	3.04
Indian Dreaming	ReelPower™ 243 'ways'	$0.01	87.15% or 90.14%	3,818,288	$0.50	50.0
Indian Dreaming	ReelPower™ 243 'ways'	$0.02	87.15% or 90.14%	2,500,358	$0.79	39.5
Dolphin Treasure	Multi	$0.01	87.87%	3,780,252–4,925,783	$0.33-$0.43	33.0-43.0
Dolphin Treasure	Multi	$0.02	87.87%	2,503,781–3,409,405	$0.47-$0.64	23.5-32.0
Dolphin Treasure	Multi	$0.05	87.87 or 90.31%	1,583,644–2,426,882	$0.77-$1.18	15.4-23.6

Source: OLGC, field observation.

The ReelPower™ configuration of Indian Dreaming, as noted in an extract from the Aristocrat web site (below), means that the player selects 'ways of winning' rather than lines – up to a possible 243 'ways, which involves all possible combinations involving all five reels of the game. This selection costs 25 credits. The basic, default configuration is three 'ways', which bets on the central line (as do all combinations) plus all positions on reel one costs one credit. Nine 'ways' adds all combinations on reels one and two, and costs three credits. Twenty seven 'ways' adds all combination on reels one, two and three and costs seven credits. Eighty one 'ways' adds all combinations on reels one, two, three and four.

> *ReelPower™ games* were another innovative game category introduced by Aristocrat. With this unique style of game, players purchase reels rather than lines. ReelPower™ opens up the power of scatter pays for all winning combinations in a five-reel video gaming machine.
> In all markets where this patented concept has been introduced, the vast majority of players purchase all five ReelPower™ reels. An additional feature is the ability to multiply the winning prize by staking up to 10 times the cost of the reels purchased.
> Since its introduction, the ReelPower™ concept has proven to be an outstanding success - both for operators and for players worldwide. (source: www.aristocrat.com.au/AUS/what/Games.asp)

In contrast, multi-line betting ranges between 3 and 50 available lines, with the 'price' of multi-line betting simply being the multiple of lines played – choosing to play 20 lines would cost 20 times the credit value being wagered. We understand that Dolphin Treasure games operating in South Australia are generally configured to allow betting up to 20 lines. We also examined the relationship between credit value and the average bet size of these games, expressed as a multiple of credit value. There is a strong negative relationship between these variables (Pearson r = -0.865; the logarithmic equation y = -0.3856Ln(x) + 1.3886 produces R^2 = 0.9505). Between the variables of theoretical utilisation (see Table 2.8) and average bet size expressed as a multiple of credit value, there is also a strong positive linear relationship (Pearson r = 0.833).[11] Thus, without wishing to overestimate the results of a limited set of data relating to a small number of EGM games, it does appear that amongst these 'high

[11] For this purpose we calculated the arithmetic average of the average bet size of Dolphin Treasure games, given that different configurations produce differing average bet sizes, as shown in Tables 2.8 and 2.9. We also calculated the arithmetic average utilisation rate for those games.

performing' EGM games there is a relatively predictable 'trade-off' between credit value, the rate of utilisation and size of average bets.

Comparative NGR, and the utilisation rate, provide some measure of the relative performance of different EGMs, and provide some benchmarks against which to assess the likelihood that a particular game is comparatively popular. Certainly, set against average NGR of $53,282 in 2004-05 and $59,615 in 2005-06, all the games identified in the 'top 250' performed well 'above' average. Even more interesting is the fact that three of the four games were substantially over-represented in terms of their relative proportion of all EGM games in the South Australian market in both 2004-05 and 2005-06.

Shogun games represented about 1.7% of all EGMs in South Australia at 30 June 2005, but accounted for 16.4% of games in the 'top 250' and 18.3% of total NGR generated in that cluster. Similarly, Shogun 2 games constituted 18.8% of the games in the top 250 and accounted for 19.8% of total NGR in that cluster, but represented only 2% of all EGM games in the system overall. Indian Dreaming games were 6% of all EGM games but accounted for 26% of the top 250 games and 25.4% of aggregate NGR in that cluster. Of the four most numerically prominent games in the 'top 250', only Dolphin Treasure was under-represented, accounting for 17.4% of all EGM games in the South Australian network, but only 15.6% of games in the top 250 and 14.4% of aggregate NGR in that cluster.

Shogun games represented about 1.8% of all EGMs within the South Australian network at 30 June 2006, but accounted for 13.6% of games in the top 250 and 13.3% of total NGR generated in that cluster. Similarly, Shogun 2 games constituted 40.0% of the games in the top 250 and accounted for 46.3% of total NGR in that cluster, but represented only 3.2% of all EGM games in the system overall. Indian Dreaming games were 8.2% of all EGM games but accounted for 22.0% of the top 250 games and 19.2% aggregate NGR in that cluster. Again, of the four most numerically prominent games in the 'top 250', only Dolphin Treasure was under-represented, given that this game accounted for 15.7% of all EGM games in the South Australian network, but only 8.8% of games in the top 250 and 7.7% of aggregate NGR in that cluster.

Of the four most prominent games in the 'top 250', only Shogun and Shogun 2 generated a higher average proportion of NGR than their respective proportion of total games in that group.

Had EGM games been distributed throughout the NGR rankings proportionate to their numbers within the system overall, there would (in 2004-05), have been four Shogun games in the 'top 250', five Shogun 2, 15 Indian Dreaming and 44 Dolphin Treasure. In fact there were, respectively, 41, 47, 65 and 39 games drawn from these four in the 'top 250'. Shogun was over-represented by a factor of 9.9, Shogun 2 by a factor of 9.3, and Indian Dreaming by a factor of 4.4. Dolphin Treasure was under represented, its relative factor being 0.9.

In 2005-06, had games been distributed through the 'top 250' according to their proportion of all EGM games, there would have been five Shogun games, eight Shogun 2, 21 Indian Dreaming and 39 Dolphin Treasure. There were in fact (respectively) 34, 100, 55 and 22. Shogun was over-represented by a factor of 7.4, Shogun 2 by a factor of 12.7, Indian Dreaming by a factor of 2.7 and Dolphin Treasure under-represented with a factor of 0.6.

Between 30 June 2005 and 30 June 2006 (over which period the total number of EGMs operating in South Australia declined from 14,062 to 12,598, or by 10.4%), the number of Shogun games remained constant (at 233), Shogun 2 increased from 285 to 398 (an increase of 39.6%), Indian Dreaming increased from 839 to 1,038 (23.7%) and Dolphin Treasure declined from 2,449 to 1,978 (-19.2%).

Further, in 2004-05, 17.6% of all Shogun games deployed in South Australia were in the 'top 250', 16.5% of all Shogun 2, 7.7% of all Indian Dreaming games and 1.6% of all Dolphin Treasure. In 2005-06, 14.6% of all Shogun games deployed in South Australia were in the 'top 250', 25.1% of all Shogun 2, 5.3% of all Indian Dreaming and 1.1% of all Dolphin Treasure.

The capacity of the South Australian market to engage in systematic 'intensification' of EGM operations is, in contrast to the Victorian market, constrained by the relatively modest scale of operator control (certainly when compared to Victoria's duopoly system). Nonetheless, the above data demonstrate that the market has adjusted operations to increase the number and proportion of 'successful' games in comparison to less 'successful' games. By any measure, Dolphin Treasure games 'underperformed' over the two year period for which data are available, and although some such games continue to occupy a position amongst the most successful, this proportion has declined substantially. In contrast, Shogun 2 has increased its representation amongst the most 'successful' games and, during a period of absolute decline in EGM numbers, seen a substantial increase in the number of games deployed, as has Indian Dreaming. The Shogun game has held its own and improved its representation amongst the 'top 250'. It can be observed that the market appears to have responded as it could be expected to, having regard to the relative performance of these four prominent games.

It can also be observed that some games (in this case, Dolphin Treasure) are prominent because they are ubiquitous, (although over the period for which we obtained data, less so) whereas the prominence of others arguably derives from their ability to maximise either REVPAC (Shogun and Shogun 2) or TOD (Indian Dreaming). It may be the case that the continuing relative ubiquity of Dolphin Treasure games reflects their historic popularity, an artefact of early success which has declined in the face of competition. This may be particularly the case in a jurisdiction where EGM turnover is relatively slow, and innovation subject to some consumer safety scrutiny (via the harm exacerbation guidelines[12]), as we understand to be the case in South Australia.

Viewed through a risk management lens, it may be reasonable to argue that EGM games with consistently high rates of average NGR are more likely to induce problematic or excessive gambling than those with more modest average NGR. Much, if not most of the value of EGM consumption is attributable to problem gamblers - as is well known, the Productivity Commission (1999, Appendix P, p. P16) estimated that about 42% of EGM consumption was attributable to about 5% of EGM gamblers, and the 2006 Northern Territory (Australia) prevalence survey estimated that 43% of EGM revenue was generated by problem gamblers (School for Social and Policy Research, 2006, p. 46). EGMs generating high average NGR are likely to be those that are very attractive to and regularly played by problem or excessive gamblers. Recent research referred to elsewhere in this report demonstrates that a large proportion, possibly as many as half, of the patrons in EGM venues at any given time are

[12] Game Approval (Gaming Machines) (No .1) Guidelines 2003

likely to be either definite or borderline problem gamblers (Caraniche 2005; Livingstone & Woolley 2007; Sharpe *et al*. 2005). We believe it is reasonable to assume that such players are making disproportionately greater use of those EGM games which are producing relatively high average bet sizes and/or high average utilisation rates.

2.4 Data relating to EGM game performance at local levels

Data were also provided by the OLGC describing EGM performance in 2004-05 in two local government areas (LGAs). These LGAs were amongst those where qualitative data collection was undertaken with problem gamblers. The purpose of analysing these data was to assess the extent to which EGM performance was affected by local conditions, and also to complement qualitative data provided by research participants. Further, we sought to explore the extent to which non-EGM game or platform characteristics could be accounted for in explanations of EGM performance.

The OLGC supplied data for 2004-05 relating to 182 EGMs located in five hotel venues in Port Lincoln, located west of Adelaide in regional South Australia. There were a total of seven venues in Port Lincoln in that year housing 211 EGMs, so data was examined relating to approximately 71.4% of venues and 86.3% of EGMs operating in that LGA. These EGMs generated 86% of published aggregate NGR for that LGA in that year. Of the EGMs for which data were obtained, 27 (14.8%) were Dolphin Treasure, four (2.2%) were Shogun games, three (1.6%) were Shogun 2 and five (2.7%) were Indian Dreaming games. Average NGR for all EGMs in Port Lincoln was $43,240 (or about $10,000 lower than the average NGR for South Australia). The highest NGR (about $109,000) was attributable to a two-cent Dolphin Treasure game first installed in October 1994. Seven (35%) of the top 20 EGMs ranked by NGR were Dolphin Treasure games, and there were no Shogun or Shogun 2 games in that cluster. One Indian Dreaming game was ranked in the top 20, at number five, with NGR of $99,842. There were four Spring Carnival games in the 'top 20', with average NGR of $97,434. The 27 Dolphin Treasure games in the five Port Lincoln venues for which we obtained data averaged NGR of $54,296. Five other games were deployed more than three times in these venues, Indian Dreaming games (of which there were six) averaged NGR of $68,032, Queen of the Nile (six) averaged NGR of $35,186, Black Rhino (five) averaged NGR of $19,283, Shogun (four) averaged NGR of $40,455, and Spring Carnival (five) averaged $94,290, the highest such average NGR. All Spring Carnival games were of one cent credit value, and the range of NGR performance was between $81,715 and $109,390. There were five Spring Carnival games in the 'top 250' games in South Australia in 2004-05, with average NGR of $177,928. None of these 'top 250' games was located at a Port Lincoln venue.

Among the five Port Lincoln venues, the first ranked venue had eleven of the top 20 ranked games. The second and third ranked venues operated four each, and the fourth ranked venue operated one. The fifth ranked venue had no EGM games in the top 20, and indeed generated an average NGR per EGM equivalent to 15.1% of that for the first ranked venue.

There is no discernible pattern of EGM games providing relatively high NGRs for venues apart from the preponderance of Dolphin Treasure games in the top 20, and the relative 'success' of the Spring Carnival games. Dolphin Treasure games are over-represented in the top 20 by a factor of 2.45, and Spring Carnival games were over-represented in the 'top 20' by a factor of 7.28. Five of the seven Dolphin Treasure games in the top 20 were operated by

the first ranked venue. The four Spring Carnival games in the 'top 20' were shared between venues ranked one (which had two such EGMs), two and three.

Across all EGM games deployed at all five venues, the performance of the four most prominent games, as identified at the statewide level, and of Spring Carnival games was as set out in Table 2.9.

Table 2.9: Relative game performance, selected games, five Port Lincoln venues, 2004-05

Game	Number	% of all games	Total NGR ($)	NGR as % of total NGR	Average NGR ($)	NGR relative to %N
Dolphin Treasure	27	14.8%	1,465,988	18.6%	54,296	1.3
Indian Dreaming	6	3.3%	408,192	5.2%	68,032	1.6
Shogun	4	2.2%	161,819	2.1%	40,455	0.9
Shogun 2	3	1.6%	157,242	2.0%	52,414	1.2
Spring Carnival	5	2.7%	471,451	6.0%	94,290	2.2

Source: OLGC (SA)

The highest ratio between the proportional revenue share of these games and their proportion of all games in the sample ('NGR relative to %N') was 2.2, generated by Spring Carnival, which achieved an average NGR of $94,290. The lowest such ratio (0.9) was generated by Shogun, which achieved an average NGR of $40,455. It is also interesting to note that the average age of EGMs across all five Port Lincoln venues was 5.1 years at 30 June 2005, compared to that for 'top 20' EGMs which was 5.7 years.

Census data relating to Port Lincoln in 2006 indicate that there were 10,060 adults resident in the Port Lincoln LGA at the time of the census. Thus, using those estimates of population, EGM density in Port Lincoln was 21 per 1,000 adults. Median household income in that LGA in 2006 was $821 per week, median individual income $436, and adult per capita EGM expenditure was $910 per annum. (ABS 2007).

The OLGC supplied data relating to 193 EGMs deployed at five hotel venues as at 30 June 2005 in Salisbury, in Adelaide's northern suburbs. There were a total of 22 venues in Salisbury in 2004-05 housing 709 EGMs, so data was examined relating to 22.7% of venues, and 27.2% of EGMs. The NGR generated by these EGMs amounted to 38.5% of the published aggregated NGR for the Salisbury LGA in 2004-05. Dolphin Treasure games represented 34 (17.7%) of these games, Indian Dreaming 17 (8.8%), and there were four each of Shogun and Shogun 2 (both 2.1% of the total games deployed in these venues). One Dolphin Treasure game, or 5% of the top 20 games, was counted in this cluster, compared to nine Indian Dreaming games (45% of the top 20), four Shogun games (20%) and three Shogun 2 games (15%). The highest NGR at Salisbury was for a one cent credit value Choy Sun Doa game, first installed in South Australia in May 2002, which generated NGR of more than $272,000. Average NGR at Salisbury for all games in these venues was just under $138,000, or more than $85,000 above the South Australian average in that year. Shogun, Shogun 2, and Indian Dreaming games were all over-represented in the top 20 games ranked by NGR in Salisbury by factors, respectively, of 9.65, 7.2 and 5.8. Dolphin Treasure was under-represented as evidenced by an equivalent factor of less than 0.3.

There was a considerably narrower range of average venue performance at Salisbury, as compared to Port Lincoln. The first ranked of the five venues had a higher proportion of the highest ranked EGMs (in this case 6, or 30%) but all other venues had at least some of the best performing EGMs (the lowest ranked had two) and the disparity between average levels of NGR was much lower than at Port Lincoln – the lowest ranked venue of the five generated an average NGR per EGM equivalent to 86.7% of that of the top ranked venue.

There were another six games deployed more than three times in the Salisbury venues for which we obtained data. Nine of these were Super Bucks 3 games, with average NGR of $138,999, there were six each of Adonis and Geisha games, with average NGR of $156,571 and $145,588 respectively, and five Spring Carnival games averaging NGR of $153,052. There were four each of Buccaneer and Choy Sun Doa, averaging NGR of $109,676 and $166,776 respectively. The 34 Dolphin Treasure games averaged NGR of $143,798 and the 17 Indian Dreaming games averaged NGR of $184,638.

Table 2.5 sets out additional data describing the overall performance of the four most prominent games at the Salisbury venues for which we obtained data for 2004-05, plus data for Super Bucks 3 and Choy Sun Doa. The highest average NGR across all venues was for Shogun 2, ($245,889). The ratio between the proportional revenue share of these games and their proportion of all games in the sample (NGR relative to %N) was 1.8. The lowest such ratio was shared by Dolphin Treasure and Super Bucks 3, which performed at par (a ratio of 1.0) with average NGR of $143,798 and $138,998 respectively. The average age of EGMs across all Salisbury venues was 5.2 years, compared to that of the 'top 20' EGMs which was 4.8 years.

Table 2.5: Relative game performance, selected games, Salisbury venues, 2004-05

Game	Number	% of all games	Total NGR ($)	NGR as % of total NGR	Average NGR ($)	NGR relative to %N
Shogun	4	2.1%	927,032	3.5%	231,758	1.7
Shogun 2	4	2.1%	983,557	3.7%	245,889	1.8
Super Bucks 3	9	4.7%	1,250,988	4.7%	138,998	1.0
Choy Sun Doa	4	2.1%	667,105	2.5%	166,776	1.2
Dolphin Treasure	34	17.6%	4,786,988	18.0%	140,794	1.0
Indian Dreaming	17	8.8%	3,138,842	11.8%	184,638	1.3

Source: OLGC (SA)

The 709 EGMs in Salisbury as at 30 June 2005 equates to an EGM density of 8.0 EGMs per 1,000 adults, based on the 2006 census estimate of an adult population of 88,830. Median household income was $875 per week, and median individual income $417. Average adult per capita EGM expenditure was $779 per annum.

Across South Australia in 2004-05, again using ABS census population data, there were on average 12.0 EGMs per 1,000 adults. South Australian median household income was $887 per week and median individual income was $433. Average EGM expenditure per adult was $639 per annum.

The four most prominent EGM games identified in the 'top 250' also appear to be prominent in the sample we obtained for the Salisbury LGA. This pattern is less clear in Port Lincoln.

The most commonly occurring game in the sample obtained in both LGAs was Dolphin Treasure, but whereas this game performed at above average levels in Port Lincoln, it was a relatively modest performing game in Salisbury. It is also interesting to note that the high density of EGMs in Port Lincoln (175% of the state wide average) appears to have produced relatively low average NGR per EGM, but high annual EGM expenditure per adult (142.4% of the state wide average). In Salisbury, a relatively modest density of EGMs (about 67% of the state wide average) produced lower EGM expenditure per adult than was the case in Port Lincoln, even though this was well above average (121.9% of the state wide average). NGR per EGM in Salisbury was well above average, particularly for the prominent games we scrutinised above.

These data suggest strong contextual factors operating in the relative performance of EGMs. Although the data we have scrutinised for this section of the report are relatively limited in scope they do assist in identifying the apparent influence of the differing market conditions under which EGMs operate. In Port Lincoln, an oversupply of what appear to be modestly performing EGMs generate very high average levels of per capita expenditure. In Salisbury, a lesser supply of relatively high performing EGMs generates more modest but nonetheless above average levels of per capita expenditure. EGMs in Salisbury are clearly utilised more intensively. Again, the importance of the relationship between utilisation rates and average expenditure is apparent.

This brief examination of the distinct patterns of EGM performance between two quite distinct LGAs reveals the importance of pursuing an understanding of local context. Studies of the relative performance of EGM games must take account of these factors, and if possible develop techniques to control for these factors. The supply of EGMs at Port Lincoln is very substantially above average and it would be expected that each individual EGM would tend to 'underperform' compared to EGM games operating in an area where the supply of EGMs is more constrained. Nonetheless, the aggregation of a large supply of relatively underperforming EGM games equates to relatively high per capita expenditure. The situation between Port Lincoln and Salisbury is analogous to the situation between South Australia and Victoria in some respects. Victoria's low average EGM density and arguably greater 'intensification' of EGM performance has lead to relatively high NGR per EGM compared to South Australia, where relatively high EGM density but more modest evidence of EGM 'intensification' produces similar overall per capita NGR. There are at least two paths to the achievement of high per capita NGR, and these may also be closely intertwined with socio-cultural and socio-economic factors.

2.5 Conclusions

It is clear that there are EGM games which consistently appear to produce comparatively high NGR per EGM. Further, the operation of the EGM market in South Australia over a period when EGM numbers declined both absolutely and relative to population appears to have favoured the accentuation of EGM games which perform most consistently at above average levels – in particular the Shogun 2, Indian Dreaming and Shogun games. It appears that Shogun 2 and Shogun games achieve relatively high NGR because of high average bets, whereas the Indian Dreaming game achieves comparatively high NGR because of comparatively high average levels of utilisation.

The comparison of data for the years 2004-05 and 2005-06 demonstrates that even in a relatively restricted EGM market (such as that prevailing in South Australia), where there are

multiple barriers to intensification (including regulatory and market-structure barriers) operators will tend to utilise those games which maximise NGR. This is unsurprising.

The Dolphin Treasure game has, over time, clearly had considerable success in the South Australian market, measured by its relative ubiquity. However it is noteworthy that this game was the only one of the four most prominent games we identified to decline in number between 2004-05 and 2005-06. Again, we suggest that this reduction reflects the comparative performance of the game (as measured by NGR). We would hypothesise that in a market such as Victoria, where innovation is less restricted and where the duopoly ownership arrangements allow for a greater measure of centralised control and decision making, a game such as Dolphin Treasure would be unlikely to endure in the market, as appears, from field observations, to be the case. In South Australia, with considerably more decentralised ownership and control of EGM games, and with some regulatory restrictions on innovation of gaming machine products, the ubiquity of the Dolphin Treasure game is likely to erode more slowly.

The comparison of games in two distinct LGAs provides further evidence of the manner of operation of the twin EGM dynamics of REVPAC and TOD. The very high EGM density in Port Lincoln results in relatively low NGR per EGM but relatively high expenditure per adult. In contrast, to the Salisbury market segment where a relatively low EGM density exists results in high NGR per EGM and a more modest, but nonetheless above average level of EGM expenditure per adult.

The EGM system is complex and highly dynamic. Data presented and analysed in this section demonstrate that the 'interface' – that is, the EGM game and its attractiveness to gamblers – is a crucial but not the only factor in determining levels of EGM expenditure. Product mix, EGM density (or relative accessibility and availability), and probably socio-economic characteristics of local areas are critical elements in determining EGM expenditure levels. In South Australia, it appears that the product mix has tended towards the maximisation of expenditure. This tendency has probably been highlighted by the reduction in EGM numbers which occurred between 2004-05 and 2005-06, and which provided an opportunity for the retirement of less well performing EGM games. Market constraints, however, probably operate to limit the capacity of EGM operators to retire all 'underperforming' EGM games quickly, and in any event some games which in the aggregate perform modestly (such as Dolphin Treasure) continue in some individual cases to generate relatively high NGR.

To the extent that levels of consumption reveal the likelihood of exacerbation of gambling derived harm, it is likely that intensification of NGR will increase harm in the aggregate. Certainly, as we argue above, there is a *prima facie* argument that EGM games which generate high NGR generate such consumption because they are disproportionately utilised by problem gamblers. We hypothesise that the two dynamics of relatively high EGM performance (TOD and REVPAC), and the importance of a 'product mix' that provides opportunity for growth in both of these factors, are well demonstrated by the most 'successful' of the EGM games operating in South Australia.

Different sites and geographical locations will clearly also have an impact on the performance of individual EGM games, as evidenced by the examination of EGM performance at Port Lincoln and Salisbury set out in this section. These are of course key elements of the EGM market and its socio-technical system.

It is our view that systematic analysis of EGM performance is likely to provide a basis for continuing risk assessment of EGM games. By risk assessment, we mean the identification of those EGM games which consistently perform at above average levels of NGR for the purposes of further study. Such further study would include collection of game data describing characteristics such as average bet size, number of spins, actual RTP and reward schedules for the purpose of profiling of particular games with respect to relative risk. The product of such an approach will be an extensive evidence base for the development of harm reduction and product safety principles.

In any event, the analysis of supply side data presented in this section provides a basis for developing a perspective on the perceptions and views of EGM users in relation to the questions this project addresses.

3. Telephone survey

3.1 Introduction

Analysis of data on gaming machine performance summarised in Section 2 highlighted the different patterns of performance of different 'high performing' EGM games. With knowledge of this in mind a telephone survey was conducted in which respondents were asked about their experiences of and engagement with gaming machine technology. The first aim of the survey was to find out which EGM games regular gamblers prefer, and to assess which features of games or gaming machines they find most attractive. The second aim of the survey was to gather information about gamblers' playing styles in terms of bet size, multiple line betting and game features, along with information on their overall level of participation in EGM gambling (for example, money and time spent per gambling session). The third aim of the survey was to seek gamblers' responses to a series of statements about the operation of gaming machines, in order to assess gamblers' understanding of the operation of gaming machine technology. The survey was conducted in late May and early June 2007. To maximise the likelihood that respondents would be familiar enough with the features and operations of gaming machines the survey was targeted at regular gamblers. Regular EGM gamblers are defined in the SA prevalence study as gamblers who usually gamble on EGMs at least once a fortnight, and we utilised this definition for the purposes of this telephone survey. This 'frequency of participation threshold' was used as a screen for the gaming machine survey. The survey script is contained at Appendix D.

3.2 Survey respondents

A total of 180 adult (i.e., 18 years or more) respondents participated in the survey. The sample was not weighted or otherwise adjusted for analytical purposes. Table 3.1 shows the gender of respondents.

Table 3.1 Gaming machine survey respondents, gender

	N	Percent
Male	80	44.4
Female	100	55.6
Total	180	100

Table 3.2 shows the age distribution of the survey respondents.

Table 3.2 Gaming machine survey respondents, age group

	N	Percent
25 years or younger	4	2.2
26-35	13	7.2
36-45	11	6.1
46-55	27	15.0
56-65	47	26.1
66-75	41	22.8
76-85	33	18.3
86-95	4	2.2
Total	180	100

The median case falls in the 56-65 year age group. Table 3.3 shows the current work status of survey respondents.

Table 3.3 Gaming machine survey respondents, current work status

	N	Percent
Work full-time	39	21.7
Work part-time	26	14.4
Home duties	6	3.3
Student	2	1.1
Unemployed	4	2.2
Retired/ age pension	96	53.3
Other	7	3.9
Total	180	100

A total of 36.1% of respondents were currently working. An absolute majority of respondents were retired or age pensioners (53.3%). Table 3.4 shows respondents' country of birth.

Table 3.4 Gaming machine survey respondents, country of birth

	N	Percent
Australia	140	77.8
UK and Ireland	16	8.9
Italy	7	3.9
Austria	2	1.1
Holland	2	1.1
New Zealand	2	1.1
Croatia	1	0.6
Cyprus	1	0.6
Denmark	1	0.6
Germany	1	0.6
Greece	1	0.6
Latvia	1	0.6
Libya	1	0.6
Malta	1	0.6
Russia	1	0.6
Ukraine	1	0.6
USA	1	0.6
Total	180	100

More than three-quarters of respondents were born in Australia. The largest non-Australian born groups come from the United Kingdom and Ireland and from Italy. No respondents were born in the Asia-Pacific region other than those from Australia and NZ. This outcome is likely to be due to a combination of cultural factors and the telephone survey methodology. Table 3.5 shows income distribution for the respondent group.

Table 3.5 Gaming machine survey respondents, income

	N	Percent
Less than $25,000	95	52.8
$25,000 to less than $50,000	49	27.2
$50,000 to less than $75,000	21	11.7
$75,000 to less than $100,000	1	0.6
$100,000 to less than $150,000	1	0.6
$150,000 and over	2	1.1
Refused	11	6.1
Total	180	100

A majority of respondents fall within the lowest income category. The vast majority of respondents (80.0%) were earning less than $AU50,000 annually. Table 3.6 shows respondents' scores on the Canadian Problem Gambling Index (CPGI). The CPGI score is used as the basis for dividing the respondents into gambler segments.

Table 3.6 Gaming machine survey respondents, CPGI scores

	N	Percent
0	90	50.0
1	28	15.6
2	16	8.9
3	8	4.4
4	10	5.6
5	5	2.8
6	3	1.7
7	3	1.7
8	2	1.1
9	2	1.1
10	2	1.1
12	3	1.7
13	1	0.6
14	3	1.7
15	1	0.6
16	2	1.1
18	1	0.6
Total	180	100

The mean CPGI score was 2.21 (SD 3.785). Half of all respondents scored zero on the CPGI. Respondents who scored zero on the CPGI are categorised as 'non-problem gamblers', as adopted in the South Australian gambling prevalence study (South Australia 2006, 112). A further 24.5% of respondents scored one or two on the CPGI, corresponding to the 'low risk' segment on the CPGI, also accepted in the SA prevalence study. A total of 16.2% of respondents scored between three and seven (inclusive) on the CPGI, equivalent to the 'moderate risk' category. The remainder (9.3%) scored eight or higher on the CPGI, equivalent to the 'high risk' category, as was also adopted in the SA prevalence study. Respondents' gambler segments are summarised in Table 3.7.

Table 3.7 Gaming machine survey respondents, gambler segments

	N	Percent
Non-problem gambler	90	50.0
Low risk gambler	44	24.5
Medium risk gambler	31	16.2
High risk gambler	15	9.3
Total	180	100

Respondents' distribution across gambler segments, as defined by the South Australian prevalence study, is shown in Table 3.7. According to the SA prevalence study (South Australia 2006) a 'problem gambler' is one who is allocated to either the medium risk (CPGI 3-7) or high risk (CPGI 8+) category by the CPGI. On this measure 46 respondents (25.5%) are problem gamblers. This figure is well in excess of the most recent calculation of the problem gambler prevalence rate for South Australia of 1.6% (South Australia 2006, 3). This is likely to be due to the sampling frame used in the gaming machine survey which only included the Northern and Western suburbs of Adelaide, where rates of EGM utilisation are significantly higher than for the rest of South Australia. The most recent prevalence study

reports that 35.2% and 35.9% respectively of survey respondents used EGMs in those suburbs compared to a statewide average of 30.2% and an Eastern suburbs average of 22.3% (South Australia 2006, 31). This sampling frame was used to facilitate recruitment of a sample of regular gamblers. The problem gambler figure of 25.5% should not therefore be compared to figures for the statewide problem gambling prevalence rate, which includes other areas of Adelaide and regional, rural and remote centres in South Australia where EGM gambling participation and expenditure is in many cases comparatively lower. For the sake of comparison, the South Australian prevalence study found that amongst regular gamblers, defined as those who gamble at least once a fortnight the problem gambling prevalence rate (CPGI 3 or greater) was 11.3% (South Australia 2006, 122). Amongst regular EGM users, data analysed in that study indicates a problem gambling prevalence rate of 12.2% (South Australia 2006, 172-3). The in-venue survey of EGM gamblers conducted by Caraniche Pty Ltd in Victoria in 2005 found that 27% of those surveyed were high risk gamblers and a further 25.4% were moderate risk gamblers (Caraniche 2005, Table 5.10). The problem gambling prevalence rate amongst those surveyed in the present study falls between these two estimates.

3.3 Descriptive survey results

This section contains univariate results from the survey. In addition, selected bivariate results are included in relation to gambling segments.

3.3.1 Gaming machine gambling participation

This sub-section details the participation of the gaming machine survey respondents in gambling on gaming machines. Table 3.8 summarises respondents' usual frequency of gambling sessions.

Table 3.8 Gaming machine survey, respondents' EGM gambling participation

	N	Percent
Daily	3	1.7
6 times per week	2	1.1
4-5 times per week	2	1.1
2-3 times per week	22	12.2
About once a week	64	35.6
At least once a fortnight	87	48.3
Total	180	100

Participants recruited to the gaming machine survey were required to be regular gamblers, defined as those who gamble at least once a fortnight. More than half of the regular gamblers recruited for the survey (51.7%) reported gambling on gaming machines at least once a week. A total of 16.1% of respondents gambled on gaming machines on multiple occasions during the course of a normal week. Table 3.9 shows the amount of time respondents usually spend gambling on gaming machines when visiting a gaming venue.

Table 3.9 Gaming machine survey, amount of time spent gambling per gaming venue visit

	N	Percent
5 minutes	5	2.8
6 minutes	1	0.6
10 minutes	6	3.3
12 minutes	1	0.6
15 minutes	6	3.3
20 minutes	6	3.3
30 minutes	36	20.0
40 minutes	2	1.1
45 minutes	7	3.9
1 hour	48	26.7
90 minutes	9	5.0
2 hours	40	22.2
3 hours	9	5.0
4 hours	2	1.1
5 hours	1	0.6
8 hours	1	0.6
Total	180	100

The amount of time respondents spent gambling on a usual visit varies widely. The mean time spent gambling was one hour and 22 minutes (SD 59 minutes). A total of 61 (33.9%) respondents gambled for half an hour or less on each visit. A middle tier of 57 respondents (31.7%) gambled for between 40 and 90 minutes. The remaining third of respondents (34.4%) gambled for two hours or more. Table 3.10 shows the amount of time respondents usually spend on activities other than gambling when visiting a gaming venue.

Table 3.10 Gaming machine survey, amount of time spent on non-gambling activities per gaming venue visit

	N	Percent
None	25	13.9
10 minutes	4	2.2
15 minutes	5	2.8
20 minutes	5	2.8
30 minutes	23	12.8
45 minutes	5	2.8
1 hour	49	27.2
90 minutes	11	6.1
2 hours	38	21.1
3 hours	10	5.6
4 hours	3	1.7
5 hours	1	0.6
8 hours	1	0.6
Total	180	100

A sizeable sub-group of respondents (n=25) do not participate in any activities other than gaming machine gambling when visiting gaming venues. Almost two-thirds of respondents (64.4%) reported spending one hour or less on other activities. The remaining third of respondents reported spending at least 90 minutes participating in non-gambling activities on a usual visit. The mean length of time for non-gambling activities was one hour and 20 minutes (SD one hour). On average across the respondent group the length of visit was two hours and 42 minutes, divided evenly between gaming machine gambling and non-gambling activity. Figure 3.1 illustrates the distribution of respondents' time use in gambling venues.

Figure 3.1 Gaming machine survey, time spent on gaming and non-gaming activity per venue visit

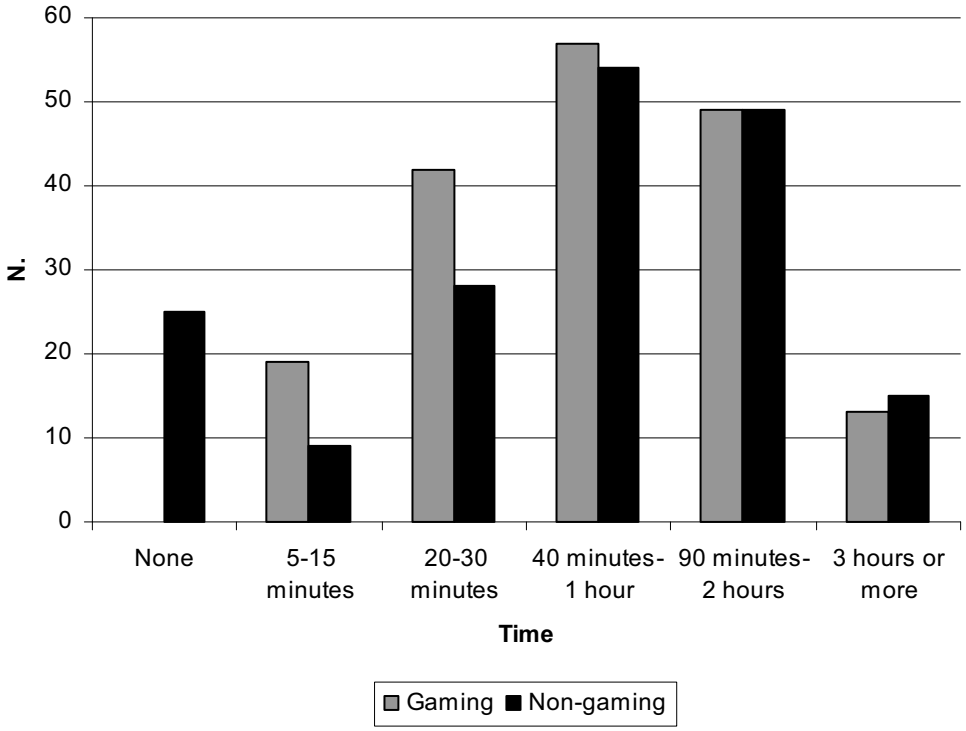


Figure 3.1 shows that the distribution of time spent on gaming and non-gaming activity is most divergent at the shorter time period end. The figure suggests that those who do not participate in any activity other than gaming are those who spend less time in the venue overall, that is, they appear to be drawn from those groups that only spend 30 minutes or less on gambling activity. This apparent difference will be analysed more closely in looking at gambler segments later in this section of the Report.

Table 3.11 Gaming machine survey, years spent gambling on gaming machines*

	N	Percent
One year or less	17	9.6
2 years	19	10.7
3 years	7	3.9
4 years	6	3.4
5 years	24	13.5
6 years	7	3.9
7 years	7	3.9
8 years	2	1.1
9 years	1	0.6
10 years	44	24.7
11 years	1	0.6
12 years	7	3.9
13 years	5	2.8
15 years	8	4.5
18 years	1	0.6
20 years	15	8.4
24 years	2	1.1
25 years	1	0.6
28 years	1	0.6
30 years	2	1.1
40 years	1	0.6
Total	178	100

* does not include missing values

Table 3.11 shows the number of years respondents have been participating in gaming machine gambling. The mean number of years gambling on gaming machines was 8.9 (median 8.5, SD 6.8). Only five respondents (2.8%) had gambled on gaming machines for six months or less. Overall, the respondents were very experienced participants in gaming machine gambling. Table 3.12 shows the average amount of money spent on gaming machine gambling on each visit to a gambling venue during the previous months.

Table 3.12 Gaming machine survey, average spend ($) on gaming machine gambling, per visit to gambling venue previous 12 months

	N	Percent
$1-$20	110	61.1
$21-$50	47	26.1
$51-$100	10	5.6
$101-$150	5	2.8
$151-$200	1	0.6
$201-$250	2	1.1
$401-$500	1	0.6
$501-$750	1	0.6
More than $1,000	1	0.6
Refused	2	1.1
Total	180	100

An absolute majority of respondents spent $20 or less on average on gaming machine gambling on each visit to a gaming venue. A total of 87.2% spent $50 or less. Relatively big spending gamblers, in per gambling visit terms, were a minority among respondents.

Respondents were asked how their visits to venues to gamble on gaming machines usually finished. The results are shown in Table 3.13.

Table 3.13 Gaming machine survey, typical finish to gambling session

	N	Percent
I always spend all the money I have available	16	8.9
I often spend all the money I have available	13	7.2
I leave the venue before all my money is gone	29	16.1
I often take out my winnings and leave	56	31.1
I always take out my winnings and leave	37	20.6
It varies regularly	29	16.1
Total	180	100

A total of 16.1% of respondents reported always or often finishing their gambling session once all their available money was expended. On the other end of this spectrum, 20.6% of respondents reported always taking out their winnings and leaving and 31.1% reported often doing so. A sizeable group reported regular variation in how gambling sessions were terminated.

3.3.2 Credit value and gaming machine preferences

Respondents were asked to allocate their time spent gambling on gaming machines according different credit values. Table 3.14 summarises the proportion of all respondents time that was spent on gaming machines of five different credit values.

Table 3.14 Gaming machine survey, time spent gambling on gaming machines by credit value, all respondents (%)

	%
One-cent machines	82.7
Two-cent machines	5.3
Five-cent machines	3.9
Ten-cent machines	0.3
Twenty-cent machines	1.3
One-dollar machines	5.9
	99.4

A very large majority of respondents' time on gaming machines was spent gambling on one-cent credit value machines. At the opposite end of the spectrum, 5.9% of respondents' time on gaming machines was on one-dollar credit value machines. Tables 3.15 to 3.20 show distribution of time spent on a particular credit value machines for each different level of credit value.

Table 3.15 Gaming machine survey, proportion of respondents' time spent gambling, one-cent credit value machines

	N	Percent
0%	18	10.0
10	1	0.6
15	1	0.6
25	2	1.1
40	1	0.6
50	6	3.3
60	2	1.1
70	3	1.7
75	1	0.6
80	13	7.2
90	14	7.8
95	6	3.3
98	1	0.6
99	5	2.8
100%	106	58.9
Total	180	100

Only 18 respondents (10.0%) did not use one-cent credit value gaming machines. Those who utilised one-cent credit value machines exclusively accounted for 65.4% of all those who used one-cent credit value machines. A total of 84.8% of survey respondents used one-cent credit value machines for more than half of the time they spent gaming machine gambling.

Table 3.16 Gaming machine survey, proportion of respondents' time spent gambling, two-cent credit value machines

	N	Percent
0%	140	77.8
1	2	1.1
2	1	0.6
5	6	3.3
9	1	0.6
10	6	3.3
12	1	0.6
15	1	0.6
20	11	6.1
25	2	1.1
30	2	1.1
50	4	2.2
100%	3	1.7
Total	180	100

More than three-quarters of respondents do not use two-cent credit value machines. Of those that do use two-cent machines, 72.5% (n=29) spent 20% or less of their time on machines of this credit value. Only 7.5% (n=3) of those who use two-cent machines do so exclusively.

Table 3.17 Gaming machine survey, proportion of respondents' time spent gambling, five-cent credit value machines

	N	Percent
0%	159	88.3
1	1	0.6
5	2	1.1
10	6	3.3
13	1	0.6
25	2	1.1
30	1	0.6
40	1	0.6
50	3	1.7
75	1	0.6
80	1	0.6
100%	2	1.1
Total	180	100

Only 11.7% of respondents (n=21) reported using five-cent credit value machines (Table 3.17). Only four respondents did more than half of their gaming machine gambling five-cent machines. Of those that did gamble on five-cent machines, 9.5% did so exclusively compared whilst 42.9% spent 10% or less of their time.

Table 3.18 Gaming machine survey, proportion of respondents' time spent gambling, ten-cent credit value machines

	N	Percent
0%	173	96.1
2	1	0.6
5	2	1.1
10	3	1.7
15%	1	0.6
Total	180	100

Only 3.9% of survey respondents reported using ten-cent credit value machines. Those who did spent no more than 15% of their total time on machines of this credit value.

Table 3.19 Gaming machine survey, proportion of respondents' time spent gambling, twenty-cent credit value machines

	N	Percent
0%	174	96.7
1	1	0.6
5	2	1.1
15	1	0.6
100%	2	1.1
Total	180	100

Only 3.3% of the respondents (n=6) reported any time gambling on twenty-cent machines. However, in two cases, respondents used twenty-cent credit value machines exclusively.

Table 3.20 Gaming machine survey, proportion of respondents' time spent gambling, one-dollar credit value machines

	N	Percent
0%	153	85.0
1	2	1.1
3	1	0.6
5	5	2.8
10	5	2.8
15	1	0.6
20	2	1.1
30	1	0.6
40	1	0.6
60	1	0.6
100%	8	4.4
Total	180	100

A total of 15.0% of respondents had used one-dollar machines. A relatively large proportion of these (29.6%) used one-dollar machines exclusively. Almost half (48.1%) of those who gambled on one-dollar machines did so for 10% or less of the total time they spent gambling on EGMs.

Respondents were asked the name of their favourite gaming machine. These data are shown in Table 3.21.

Table 3.21 Gaming machine survey, respondents' favourite gaming machine

	N	Percent
Indian Dreaming	22	12.2
Dolphin Treasure	20	11.1
Shogun or Shogun 2	9	5.0
Treasure Chest	8	4.4
Queen of the Nile	5	2.8
Black Rhino	4	2.2
Choy Sun Doa	2	1.1
Other	31	17.2
Can't recall its name	26	14.4
Don't have a favourite machine	53	29.4
	180	100

Respondents named thirty-eight different gaming machines as their favourite. These machines accounted for 56.2% of all respondents. The remainder of the respondents either were unable to recall the name of their favourite machine or did not have a favourite. The four most popular machines were Indian Dreaming, Dolphin Treasure, Shogun (versions 1 and 2) and Treasure Chest. Indian Dreaming, Dolphin Treasure and Shogun games are those identified in Section 2 of this Report as the most prominent EGM games in the 'top 250' gaming machines operating in the South Australian consumption market.

3.3.3 Bet size and numbers of lines gambled

Gambling on gaming machines involves a fundamental combination of stake and coverage. Respondents were asked about where their normal staking was located on the continuum minimum-medium-maximum. They were also asked where their coverage strategy was located on the continuum single-multiple-maximum. The results are shown in Table 3.22.

Table 3.22 Gaming machine survey, respondents' gambling strategy, bet size/number of lines bet

	N	Percent
Minimum bet - one line	13	7.2
Minimum bet - multiple lines (but less than the maximum)	37	20.6
Minimum bet - maximum lines	60	33.3
Medium bet - one line	1	0.6
Medium bet - multiple lines (but less than the maximum)	24	13.3
Medium bet - maximum lines	12	6.7
Maximum bet - one line	4	2.2
Maximum bet - multiple lines (but less than the maximum)	7	3.9
Maximum bet - maximum lines	14	7.8
Don t have a style / it varies	8	4.4
Total	180	100

The vast majority of respondents (95.6%) nominated a preferred staking and coverage strategy. More than half (53.9%) make minimum bets on multiple or maximum lines. A total of 61.1% of respondents use minimum bets as their usual strategy. Respondents who make medium bets (20.6%) are most likely to gamble on multiple lines. Respondents who usually make maximum bets (13.9%) are most likely to gamble on the maximum number of lines. The most common strategy used by gamblers is minimum bet on maximum lines, which was favoured by one-third of respondents.

3.3.4 Attractiveness of gaming machine features

Respondents were asked to rate different features of gaming machines on a four point scale. The results are shown in Table 3.23.

Table 3.23 Gaming machine survey, attractiveness of gaming machine features

		Unattractive	Not very attractive	Attractive	Very attractive	Undecided	Total
Reel symbols	*N*	29	33	66	9	43	180
	Percent	16.1	18.3	36.7	5.0	23.9	100
Multiple line betting	*N*	25	30	71	28	26	180
	Percent	13.9	16.7	39.4	15.6	14.4	100
Music & sound	*N*	49	46	45	20	20	180
	Percent	27.2	25.6	25.0	11.1	11.1	100
Frequent payouts	*N*	4	12	43	107	14	180
	Percent	2.2	6.7	23.9	59.4	7.8	100
Colour, lights & graphics	*N*	20	52	59	21	28	180
	Percent	11.1	28.9	32.8	11.7	15.6	100
Free spins or free games	*N*	4	3	48	120	5	180
	Percent	2.2	1.7	26.7	66.7	2.8	100
Special feature within game	*N*	17	21	64	47	31	180
	Percent	9.4	11.7	35.6	26.1	17.2	100
Music & lights accompanying wins	*N*	43	38	46	38	15	180
	Percent	23.9	21.1	25.6	21.1	8.3	100
Theme or character of the game	*N*	21	34	69	20	36	180
	Percent	11.7	18.9	38.3	11.1	20.0	100
Big payouts	*N*	2	8	28	130	12	180
	Percent	1.1	4.4	15.6	72.2	6.7	100

Respondents appear most strongly attracted by reinforcements. Big payouts (87.8%), frequent payouts (83.3%) and free games (93.4%) were all attractive to respondents, with a large majority of respondents reporting they were very attracted by these three features. Relatively small proportions of respondents were undecided about these features. An absolute majority of respondents also find multiple line betting (55.0%) and special features within games (61.7%) attractive to some degree.

Respondents were divided in their assessment of the attractiveness of several gaming machine features including: reel symbols; colour, lights and graphics; music and lights accompanying wins; and theme or character of the game. These four characteristics can all be categorised as related primarily to the aesthetics or presentation of the device. Relatively large proportions of respondents were undecided about the attractiveness of each of these four characteristics, apart from music and lights accompanying wins. This may reflect either a level of indifference or a lack of conscious awareness of the role of these features in the overall gaming machine gambling experience, or a combination of indifference and lack of awareness.

An absolute majority of respondents (52.8%) find the music and lights of gaming machines unattractive to some degree. Music and sounds, whether associated with the general operations of machines or with emphasising wins, are the most unattractive features of gaming machines according to respondents.

3.3.5 Perceptions of the interaction between gaming machines and gamblers

Respondents were asked about their level of agreement to four statements about the interactive relationship between gaming machine technology and gamblers. The responses are shown in Table 3.24.

Table 3.24 Gaming machine survey, statements about gaming machine operations, respondents' level of agreement

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know	Total
Skilful play will make gaming machines pay out more frequently	*N*	145	16	9	4	4	2	180
	Percent	80.6	8.9	5.0	2.2	2.2	1.1	100
Machines will pay out if you keep playing them	*N*	110	30	21	10	8	1	180
	Percent	61.1	16.7	11.7	5.6	4.4	0.6	100
It is possible to trigger a win by increasing the size of your bet or the number of lines played	*N*	111	16	26	20	6	1	180
	Percent	61.7	8.9	14.4	11.1	3.3	0.6	100
Some machines pay out more than others	*N*	46	14	50	34	34	2	180
	Percent	25.6	7.8	27.8	18.9	18.9	1.1	100

All four statements were presented to respondents in positive terms. A large absolute majority of respondents strongly disagreed with the first three statements, related to skill (89.5%) and persistence (77.8%) in EGM gambling, and the responsiveness (70.6%) of gaming machines. However, respondents were quite evenly divided in relation to differences between gaming machines, with a comparatively large proportion of the respondents (27.8%) neither agreeing nor disagreeing with the statement. It is also noticeable that a larger proportion of respondents agreed with each successive statement, 4.4% of respondents agreeing with the proposition that 'skilful play will make gambling machines pay out more frequently', while 14.4% agreed that 'it is possible to trigger a win by increasing the size of your bet or the number of lines played' and 37.8% agreeing that 'some machines pay out more than others'.

3.3.6 Gambler segments

As described above, the CPGI is used to allocate respondents to one of four segments: non-problem gambler (CPGI score 0); low risk gambler (1-2); medium risk gambler (3-7); or high risk gambler (8-27). Consistent with previous practice in South Australia, medium risk and high risk gamblers are conflated into the category 'problem gamblers' and regarded as being broadly equivalent to a SOGS score of 5+ although the CPGI is thought likely to slightly underestimate the population of problem gamblers in comparison to the SOGS (South Australia 2006, 113-4). Analysis of problem gambler characteristics is contained in the statistical results section, below. This section describes respondents' distribution into the four gambler segments.

Table 3.25 Gaming machine survey, gambler segments by gender

		Non-problem gambler	Low risk gambler	Moderate risk gambler	High risk gambler	Total
Male	*N*	41	23	10	6	80
	Percent	45.6	52.3	34.5	35.3	44.4
Female	*N*	49	21	19	11	100
	Percent	54.4	47.7	65.5	64.7	55.6
Total	*N*	90	44	29	17	180
	Percent	100	100	100	100	100

Table 3.25 shows respondents' distribution across gambler segments by gender. Female respondents are over-represented in the moderate and high risk gambler segments compared

to the respondent group as a whole. An absolute majority of male respondents are allocated to the non-problem gambler segment.

Table 3.26 Gaming machine survey, gambler segments by work status

		Non-problem gambler	Low risk gambler	Moderate risk gambler	High risk gambler	Total
Work full-time	*N*	18	11	5	5	39
	Percent	20.0	25.0	17.2	29.4	21.7
Work part-time	*N*	11	4	5	6	26
	Percent	12.2	9.1	17.2	35.3	14.4
Home duties	*N*	4	1	0	1	6
	Percent	4.4	2.3	0.0	5.9	3.3
Student	*N*	1	1	0	0	2
	Percent	1.1	2.3	0.0	0.0	1.1
Unemployed	*N*	1	2	0	1	4
	Percent	1.1	4.5	0.0	5.9	2.2
Retired/age pensioner	*N*	53	24	16	3	96
	Percent	58.9	54.5	55.2	17.6	53.3
Other	*N*	2	1	3	1	7
	Percent	2.2	2.3	10.3	5.9	3.9
Total	*N*	90	44	29	17	180
	Percent	100	100	100	100	100

The distribution of respondents across gambler segments by work status is shown in Table 3.26. Those respondents who are currently employed appear to be over-represented in the high risk segment. Retired/age pensioners are under-represented in the high risk segment.

Table 3.27 Gaming machine survey, gambler segments by country of birth

		Non-problem gambler	Low risk gambler	Moderate risk gambler	High risk gambler	Total
Australia	*N*	71	34	22	13	140
	Percent	78.9	77.3	75.9	76.5	77.8
Austria	*N*	1	0	0	1	2
	Percent	1.1	0.0	0.0	5.9	1.1
Holland	*N*	1	0	0	1	2
	Percent	1.1	0.0	0.0	5.9	1.1
Italy	*N*	3	2	2	0	7
	Percent	3.3	4.5	6.9	0.0	3.9
New Zealand	*N*	2	0	0	0	2
	Percent	2.2	0.0	0.0	0.0	1.1
UK and Ireland	*N*	7	5	4	0	16
	Percent	7.8	11.4	13.8	0.0	8.9
Other country	*N*	5	3	1	2	11
	Percent	5.6	6.8	3.4	11.7	6.1
Total	*N*	90	44	29	17	180
	Percent	100	100	100	100	100

Table 3.27 shows the distribution of respondents across gambler segments by country of birth. Respondents appear evenly distributed across segments on this variable compared to the group as a whole.

Table 3.28 Gaming machine survey, gambler segments by income

		Non-problem gambler	Low risk gambler	Moderate risk gambler	High risk gambler	Total
Less than $25,000	*N*	45	23	20	7	95
	Percent	50.0	52.3	69.0	41.2	52.8
$25,000 to less than $50,000	*N*	23	13	5	8	49
	Percent	25.6	29.5	17.2	47.1	27.2
$50,000 to less than $75,000	*N*	11	6	3	1	21
	Percent	12.2	13.6	10.3	5.9	11.7
$75,000 to less than $100,000	*N*	0	0	0	1	1
	Percent	0.0	0.0	0.0	5.9	0.6
$100,000 to less than $150,000	*N*	1	0	0	0	1
	Percent	1.1	0.0	0.0	0.0	0.6
$150,000 and over	*N*	2	0	0	0	2
	Percent	2.2	0.0	0.0	0.0	1.1
Refused	*N*	8	2	1	0	11
	Percent	8.9	4.5	3.4	0.0	6.1
Total	*N*	90	44	29	17	180
	Percent	100	100	100	100	100

The distribution of respondents across gambler segments by income is shown in Table 3.28. Respondents in the two lowest income groups appear over-represented in the moderate risk and high risk segments. Of the small number of respondents who refused to give their income almost three-quarters were non-problem gamblers.

Table 3.29 Gaming machine survey, gambler segments by age group

		Non-problem gambler	Low risk gambler	Moderate risk gambler	High risk gambler	Total
25 years or younger	*N*	1	2	0	1	4
	Percent	1.1	4.5	0.0	5.9	2.2
26-35	*N*	8	4	1	0	13
	Percent	8.9	9.1	3.4	0.0	7.2
36-45	*N*	4	4	0	3	11
	Percent	4.4	9.1	0.0	17.6	6.1
46-55	*N*	7	7	6	7	27
	Percent	7.8	15.9	20.7	41.2	15.0
56-65	*N*	28	4	10	5	47
	Percent	31.1	9.1	34.5	29.4	26.1
66-75	*N*	21	10	10	0	41
	Percent	23.3	22.7	34.5	0.0	22.8
76-85	*N*	19	11	2	1	33
	Percent	21.1	25.0	6.9	5.9	18.3
86-95	*N*	2	2	0	0	4
	Percent	2.2	4.5	0.0	0.0	2.2
Total	*N*	90	44	29	17	180
	Percent	100	100	100	100	100

Table 3.29 shows the distribution of respondents across gambler segments by age group. Respondents in the 46-55 years age group appear to be over-represented in the high risk gambler segment. Only 25.9% of respondents in this age group are in the non-problem gambler segment. In contrast, more than half of respondents in the 26-35 age bracket (61.5%), the 56-65 bracket (59.6%), the 66-75 bracket (51.2%) and the 76-85 bracket (57.6%) are in the non-problem gambler segment.

There were five gaming machines which more than one problem gambler nominated as their favourite. These were: Indian Dreaming (n=9, 19.6%); Dolphin Treasure (n= 8, 17.4%); and Choy Sun Doa, Queen of the Nile and Shogun 1 or 2 (all n=2, 4.3%). Indian Dreaming and Dolphin Treasure were both disproportionately popular amongst problem gamblers compared to all respondents (see Table 3.21). There was a statistically significant difference between problem and non-problem gamblers ($p<0.05$) relation to the nomination of Indian Dreaming as favourite gaming machine. However, a correlation coefficient of 0.131 (using Pearson's test) would not suggest this is a strong relationship.

In terms of the average amount of time spent gambling per gambling venue visit, respondents in the problem gambler segment reported spending more time than those in the non-problem gambler segment. The mean amount of time spent gambling on gaming machines per gaming venue visit, by respondents in the non-problem gambler segment, was 60 minutes (SD = 45 minutes). The mean amount of time spent gambling on gaming machines per gaming venue visit, by respondents in the problem gambler segment, was 110 minutes (SD = 81 minutes).

Respondents in the problem gambler segment reported spending the vast majority of their time (81.5%) gambling on one-cent credit value machines. Those in the problem gambler segment spent 9.4% of their time gambling on two-cent machines, 1.6% of their time on five-cent machines and 4.7% gambling on one dollar machines. These results matched closely those for the respondent group as a whole (see Table 3.14). Non-problem gamblers reported spending 83.1% of their time gambling on one-cent credit value machines, 3.9% of their time gambling on two-cent machines, 4.8% of their time gambling on five-cent machines and 6.3% of their time gambling on one dollar machines. There was little apparent difference between gambler segments for this variable.

Table 3.30 compares non-problem and problem gambler segments staking (bet) and coverage (number of lines) preferences.

Table 3.30 Gaming machine survey, betting style, non-problem & problem gambler segments

		Non-problem gamblers	Problem gamblers	Total
Minimum bet - one line	*N*	11	2	13
	Percent	8.2%	4.3%	7.2%
Minimum bet - multiple lines (less than maximum)	*N*	33	4	37
	Percent	24.6%	8.7%	20.6%
Minimum bet - maximum lines	*N*	47	13	60
	Percent	35.1%	28.3%	33.3%
Medium bet - one line	*N*	1	0	1
	Percent	.7%	.0%	.6%
Medium bet - multiple lines (less than maximum)	*N*	14	10	24
	Percent	10.4%	21.7%	13.3%
Medium bet - maximum lines	*N*	5	7	12
	Percent	3.7%	15.2%	6.7%
Maximum bet - one line	*N*	4	0	4
	Percent	3.0%	.0%	2.2%
Maximum bet - multiple lines (less than maximum)	*N*	5	2	7
	Percent	3.7%	4.3%	3.9%
Maximum bet - maximum lines	*N*	8	6	14
	Percent	6.0%	13.0%	7.8%
Don t have a style / it varies	*N*	6	2	8
	Percent	4.5%	4.3%	4.4%
Total	*N*	134	46	180
	Percent	100.0%	100.0%	100.0%

Respondents in the non-problem gambler segment reported favouring minimum bet gambling styles more heavily than did those in the problem gambler segment. This was the case overall, but particularly in relation to minimum bets and multiple line betting. Higher proportions of problem gamblers reported favouring medium or maximum bet staking preferences.

Maximum bets were the most popular coverage preference in relation to minimum and maximum staking preferences. Multiple lines was the preferred coverage style of those who made medium size bets. This was the case for both problem and non-problem segments.

3.4 Statistical results

Comparisons between non-problem gamblers (n=134) and problem gamblers (n=46) were conducted. Table 3.31 summarises results of chi square tests for respondent characteristics and gaming machine gambling participation. Based on the descriptive results (Table 3.23) it was expected that results would indicate significant differences between problem and non-problem gamblers, particularly in terms of levels of participation in gaming machine gambling.

Table 3.31 Gaming machine surveys, chi square tests, respondent characteristics and participation in gaming machine gambling

	Non-problem gambler (n=134) % (n)	Problem gambler (n=46) % (n)	p-value from chi square tests
Gender			
- males	47.8 (64)	34.8 (16)	p=0.126
- females	52.2 (70)	65.2 (30)	
Work status			
- full time	21.6 (29)	21.7 (10)	p=0.118
- part time	11.2 (15)	23.9 (11)	
- retired	57.5 (77)	41.3 (19)	
- other	9.7 (13)	13.0 (6)	
Income	**(n=124)**	**(n=45)**	
- <$25,000	54.8 (68)	60.0 (27)	p=0.698
- $25,000 - < $50,000	29.0 (36)	28.9 (13)	
- $50,000+	16.1 (20)	11.1 (5)	
Age group			
- 35 years and younger	11.2 (15)	4.3 (2)	**p=0.007**
- 36-45	6.0 (8)	6.5 (3)	
- 46-55	10.4 (14)*	28.3 (13)*	
- 56-65	23.9 (32)	32.6 (15)	
- 66-75	23.1 (31)	21.7 (10)	
- 76 and older	25.4 (34)*	6.5 (3)*	
Rate of play per week in last 12 months			
- less than once per wk	53.0 (71)*	32.6 (15)*	**p<0.001**
- once per week	38.1 (51)	30.4 (14)	
- 2-3 times per week	6.7 (9)*	28.3 (13)*	
- 4-7 times per week	2.2 (3)	8.7 (4)	
Number of years have played pokies	**(n=133)**	**(n=45)**	
- < 1 year	6.0 (8)	0.0 (0)	**p=0.030**
- 1-2 years	15.8 (21)	15.6 (7)	
- 3-5 years	24.1 (32)	11.1 (5)	
- 6-10 years	27.8 (37)*	53.3 (24)*	
- 11-15 years	12.8 (17)	8.9 (4)	
- 16+ years	13.5 (18)	11.1 (5)	
Average time spent on pokies	**(n=134)**		
- < 30 minutes	18.7 (25)*	2.2 (1)*	**p<0.001**
- 30-59 minutes	29.1 (39)*	13.0 (6)*	
- 1-2 hours	48.5 (65)*	67.4 (31)*	
- 3+ hours	3.7 (5)*	17.4 (8)*	

Table 3.31 continued

Average time spent on other activities at poker venues	**(n=134)**		
- 0 minutes	8.2 (11)*	30.4 (14)*	**p=0.001**
- 1-29 minutes	6.7 (9)	10.9 (5)	
- 30-59 minutes	14.2 (19)	19.6 (9)	
- 1-2 hours	60.4 (81)*	37.0 (17)*	
- 3+ hours	10.4 (14)	2.2 (1)	
Average amount of money spent per session on pokies in last 12 months	**(n=132)**		
- $1 - $20	75.8 (100)*	21.7 (10)*	**p<0.001**
- $21 - $50	18.9 (25)*	47.8 (22)*	
- $51+	5.3 (7)*	30.4 (14)*	
Statement that best describes a typical gambling session:			
- always spend all money available	6.7 (9)	15.2 (7)	**p=0.004**
- often spend all money available	3.7 (5)*	17.4 (8)*	
- leave before money is all gone	17.2 (23)	13.0 (6)	
- often take winnings and leave	32.8 (44)	26.1 (12)	
- always take winnings and leave	24.6 (33)*	8.7 (4)*	
- varies regularly	14.9 (20)	19.6 (9)	

* indicates adjusted residuals <-2.0 or >2.0

The only respondent characteristic on which there was a significant difference between problem and non-problem gamblers was age. This difference was apparent at the 46-55 years and 76 and older age groups. Significant differences exist between the two groups in terms of seven different participation variables. Three variables returned the strongest results (p = <0.001). These were frequency of gambling sessions, the average time spent per session and the average amount of money spent (size of loss). There was also a significant difference between problem and non-problem segments in the number of years an individual had been gambling on gaming machines, the average time spent on other activities in the venue; the usual betting style and the way in which a typical gambling session was finalised.

Table 3.32 shows results for chi square tests on the attractiveness of gaming machine features. Based on the descriptive results it was not expected that significant differences would be found between non-problem and problem gambler segments, with the possible exception of variables relating to sound and lighting features of gaming machines.

Table 3.32 Gaming machine survey, chi square tests, attractiveness of gambling machine features

	Unattractive % (n)	Not very attractive % (n)	Undecided % (n)	Attractive % (n)	Very attractive % (n)	p-value
Reel symbols						
- Non-problem gambler	12.7 (17)^	19.4 (26)	27.6 (37)	36.6 (49)	3.7 (5)	p=0.064
- Problem gambler	26.1 (12)^	15.2 (7)	13.0 (6)	37.0 (17)	8.7 (4)	
Multiple line betting						
- Non-problem gambler	14.2 (19)	17.2 (23)	16.4 (22)	38.8 (52)	13.4 (18)	p=0.542
- Problem gambler	13.0 (6)	15.2 (7)	8.7 (4)	41.3 (19)	21.7 (10)	
Music & sound						
- Non-problem gambler	25.4 (34)	26.1 (35)	13.4 (18)	24.6 (33)	10.4 (14)	p=0.477
- Problem gambler	32.6 (15)	23.9 (11)	4.3 (2)	26.1 (12)	13.0 (6)	
Frequent payouts						
- Non-problem gambler	3.0 (4)	7.5 (10)	6.7 (9)	23.1 (31)	59.7 (80)	invalid
- Problem gambler	0.0 (0)	4.3 (2)	10.9 (5)	26.1 (12)	58.7 (27)	
Colour, lights & graphics						
- Non-problem gambler	12.7 (17)	26.9 (36)	17.9 (24)	32.1 (43)	10.4 (14)	p=0.339
- Problem gambler	6.5 (3)	34.8 (16)	8.7 (4)	34.8 (16)	15.2 (7)	
Free spins or games						
- Non-problem gambler	3.0 (4)	2.2 (3)	3.7 (5)	26.1 (35)	64.9 (87)	invalid
- Problem gambler	0.0 (0)	0.0 (0)	0.0 (0)	28.3 (87)	71.7 (33)	
Game features						
- Non-problem gambler	9.7 (13)	11.9 (16)	20.1 (27)	35.1 (47)	23.1 (31)	p=0.343
- Problem gambler	8.7 (4)	10.9 (5)	8.7 (4)	37.0 (17)	34.8 (16)	
Music & lights with wins						
- Non-problem gambler	17.9 (24)*	23.1 (31)	8.2 (11)	27.6 (37)	23.1 (31)	**p=0.029**
- Problem gambler	41.3 (19)*	15.2 (7)	8.7 (4)	19.6 (9)	15.2 (7)	
Theme of game						
- Non-problem gambler	11.9 (16)	20.1 (27)	21.6 (29)	35.8 (48)	10.4 (14)	p=0.689
- Problem gambler	10.9 (5)	15.2 (7)	15.2 (7)	45.7 (21)	13.0 (6)	
Big payouts						
- Non-problem gambler	1.5 (2)	5.2 (7)	6.7 (9)	14.9 (20)	71.6 (96)	invalid
- Problem gambler	0.0 (0)	2.2 (1)	6.5 (3)	17.4 (8)	73.9 (34)	

* indicates adjusted residuals <-2.0 or >2.0 ^ trend toward significant difference

The results of the chi square tests on the attractiveness of gaming machine characteristics show a significant difference between problem and non-problem gamblers on the variable of music and lights accompanying wins. Problem gamblers were more likely to find this feature of gaming machines unattractive ($p < .05$).

Initial tests on primary reinforcement features were unsuccessful due to the small numbers of cases who did not find frequent payouts, free games and big payouts attractive. To overcome this problem data was modified to pool the three possible responses aside from attractive and very attractive. The results of these tests are shown in Table 3.33.

Table 3.33 Gaming machine survey, modified chi square tests, primary reinforcement features of gaming machines

	Unattractive / Not very attractive / Undecided % (n)	Attractive % (n)	Very attractive % (n)	p-value
Frequent payouts				
- Non-problem gambler	12.8 (23)	23.1 (31)	59.7 (80)	0.901
- Problem gambler	3.9 (7)	26.1 (12)	58.7 (27)	
Free spins or games				
- Non-problem gambler	6.7 (12)	26.1 (35)	64.9 (87)	0.110
- Problem gambler	0.0 (0)	28.3 (87)	71.7 (33)	
Big payouts				
- Non-problem gambler	10.0 (18)	14.9 (20)	71.6 (96)	0.675
- Problem gambler	2.2 (4)	17.4 (8)	73.9 (34)	

No significant differences were found between problem and non-problem gambler segments in these modified tests of primary reinforcement features.

Logistic regressions were conducted to further analyse differences between problem and non-problem gamblers on particular variables. Table 3.34 shows results for logistic regressions for respondent characteristics.

Table 3.34 Gaming machine survey, logistic regressions, respondent characteristics

Variable	n	Odds ratio	95% CI	p-value
Gender	180	1.7	0.86, 3.43	0.129
Work status				
- Retired (ref)	96	-	-	-
- Full time	39	1.4	0.58, 3.36	0.454
- Part time	26	3.0	1.18, 7.50	**0.021**
- Other	19	1.9	0.63, 5.56	0.260
Income				
- <$25,000 (ref)	95	-	-	-
- $25,000 - <$50,000	49	0.9	0.42, 2.0	0.810
- $50,000+	25	0.6	0.21, 1.85	0.400
Age				
- 35 and younger (ref)	17	-	-	-
- 36-45	11	2.8	0.39, 20.46	0.307
- 46-55	27	7.0	1.32, 35.53	**0.022**
- 56-65	47	3.5	0.71, 17.37	0.123
- 66-75	41	2.4	0.47, 12.45	0.291
- 76 and older	37	0.7	0.10, 4.38	0.668

Table 3.34 shows the odds ratios and associated p-values for respondent characteristics. Respondents in the problem gambler segment were three times more likely to be employed in a part-time job compared with those in the non problem gambler segment. Those respondents in the problem gambler segment were seven times more likely to be aged in the 46-55 year age bracket than those in the non-problem gambler segment.

Table 3.35 Gaming machine survey, logistic regressions, gaming machine gambling participation

Variable	n	Odds ratio	95% CI	p-value
Rate of play per week in last 12 months				
- less than once per week (ref)	86	-	-	-
- once per week	65	1.3	0.58, 2.93	0.528
- 2-3 times per week	22	6.8	2.47, 18.89	**<0.001**
- 4-7 times per week	7	6.3	1.28, 31.17	**0.024**
Number of years have played the pokies				
- up to 2 years (ref)	36	-	-	-
- 3-5 years	37	0.7	0.18, 2.27	0.496
- 6-10 years	61	2.7	1.01, 7.10	**0.046**
- 11-15 years	21	1.0	0.25, 3.82	0.971
- 16+ years	23	1.2	0.32, 4.18	0.831
Average time spent on pokies				
- <30 minutes (ref)	26	-	-	-
- 30-59 minutes	45	3.8	0.44, 33.88	0.225
- 1-2 hours	96	11.9	1.54, 92.07	**0.017**
- 3+ hours	13	40.0	4.05, 395.0	**0.002**
Average time spent on other activities at poker venues				
- 0 minutes (ref)	25	-	-	-
- 1-59 minutes	14	0.4	0.11, 1.68	0.228
- 30-59 minutes	28	0.4	0.12, 1.14	0.083
- 1+ hour	113	0.1	0.06, 0.38	**<0.001**
Money spent per session on average, last 12 months				
- $1 - $20 (ref)	110	-	-	-
- $21 - $50	47	8.8	3.70, 20.93	**<0.001**
- $51+	21	20	6.55, 61.06	**<0.001**
Statement that best describes a typical gambling session:				
- always take winnings and leave (ref)	37	-	-	-
- often take winnings and leave	56	2.3	0.67, 7.61	0.192
- leave the venue before all money gone	29	2.2	0.55, 8.49	0.274
- often spend all the money	13	13.2	2.87, 60.64	**0.001**
- always spend all the money	16	6.4	1.53, 26.88	**0.011**
- varies regularly	29	3.7	1.01, 13.65	**0.048**

Table 3.35 shows the odds ratios and associated p-values for participation in gaming machine gambling variables. Respondents in the problem gambler segment were around seven times more likely than those in the non-problem gambler segment to gamble on gaming machines 2-3 times a week. The problem gambler segment was twelve times more likely than the non-problem gambler segment to spend an average of one hour per gambling session, and forty times more likely to three or more hours per session. The problem gambler segment was far less likely than the non-problem gambler segment to spend an hour or more on activities other than gambling when visiting a gaming venue. The problem gambler segment was nearly nine times more likely to spend in excess of $20 per gambling session and twenty times more likely to spend $51 or more than were respondents in the non-problem gambler segment. Problem gamblers were also far more likely to spend all available money than non-problem gamblers.

Table 3.36 Gaming machine survey, logistic regressions, attractiveness of gaming machine features

Variable	n	Odds ratio	95% CI	p-value
Reel symbols				
- Unattractive (ref)	29	-	-	-
- Not very attractive	33	0.4	0.13, 1.16	0.090
- Undecided	43	0.2	0.07, 0.72	**0.011**
- Attractive	66	0.5	0.20, 1.24	0.131
- Very attractive	9	1.1	0.25, 5.12	0.871
Multiple line betting				
- Unattractive (ref)	25	-	-	-
- Not very attractive	30	1.0	0.78, 3.36	0.954
- Undecided	26	0.6	0.14, 2.35	0.442
- Attractive	71	1.2	0.40, 3.33	0.787
- Very attractive	28	1.8	0.53, 5.84	0.356
Music & sound				
- Unattractive (ref)	49	-	-	-
- Not very attractive	46	0.7	0.29, 1.77	0.465
- Undecided	20	0.3	0.05, 1.23	0.088
- Attractive	45	0.8	0.34, 2.02	0.673
- Very attractive	20	1.0	0.31, 3.02	0.960
Frequent payouts				
- Unattractive (ref)	4	invalid		
- Not very attractive	12			
- Undecided	14			
- Attractive	43			
- Very attractive	107			
Colour, lights & graphics				
- Unattractive (ref)	20	-	-	-
- Not very attractive	52	2.5	0.65, 9.83	0.184
- Undecided	28	0.9	0.19, 4.78	0.945
- Attractive	59	2.1	0.54, 8.17	0.281
- Very attractive	21	2.8	0.62, 13.04	0.181
Free spins or games				
- Unattractive (ref)	4	invalid		
- Not very attractive	3			
- Undecided	5			
- Attractive	48			
- Very attractive	120			
Game features				
- Unattractive (ref)	17	-	-	-
- Not very attractive	21	1.0	0.23, 4.57	0.984
- Undecided	31	0.5	0.10, 2.24	0.351
- Attractive	64	1.2	0.34, 4.10	0.800
- Very attractive	47	1.7	0.47, 5.99	0.426
Music & lights with win				
- Unattractive (ref)	43	-	-	-
- Not very attractive	38	0.3	0.10, 0.79	**0.016**
- Undecided	15	0.5	0.13, 1.67	0.238
- Attractive	46	0.3	0.12, 0.79	**0.014**
- Very attractive	38	0.3	0.10, 0.79	**0.016**

Table 3.36 continued

Theme or character of the game				
- Unattractive (ref)	21	-	-	-
- Not very attractive	34	0.8	0.23, 3.06	0.779
- Undecided	36	0.8	0.21, 2.83	0.697
- Attractive	69	1.4	0.45, 4.32	0.559
- Very attractive	20	1.4	0.34, 5.49	0.655
Big payouts				
- Unattractive (ref)	2	invalid		
- Not very attractive	8			
- Undecided	12			
- Attractive	28			
- Very attractive	130			

Table 3.36 shows odds ratios and associated p-values for attractiveness of gaming machine features. As descriptive results suggested there is little to report from these regressions. Problem gamblers were less likely to find music and lights accompanying wins attractive or not very attractive compared to finding this feature unattractive.

Table 3.37 shows the results of chi square test of the difference between the betting styles of problem and non-problem gamblers.

Table 3.37 Gaming machine survey, chi square test, betting style

	Non-problem gambler (n=134) % (n)	**Problem gambler (n=46) % (n)**	**p-value from chi square tests**
Usual betting style			
- Minimum bet (any lines)	67.9 (91)*	41.3 (19)*	**P=0.006**
- Medium bet (any lines)	14.9 (20)*	37.0 (17)*	
- Maximum bet (any lines)	12.7 (17)	17.4 (8)	
- Varies / no particular style	4.5 (6)	4.3 (2)	

The difference in betting styles, in terms of number of lines bet, between non-problem and problem gambler segments attained significance. There was a significant difference between non-problem gambler and problem gamble segments preference for minimum and medium staking styles. Regression analysis indicated that the respondents in the problem gambler segment were less likely to place a minimum bet of multiple lines than those in the non-problem gambler segment (OR: 0.23 [95%CI: 0.07, 0.70]). Analysis was also conducted of any difference between these two segment in terms of minimum bet with maximum lines (mini-maxi) betting style, with no significant difference being found.

3.5 Conclusions

The survey of regular problem gamblers produced a number of interesting results. The respondents were a demographically older and female group, who were as likely to be retired as any other labour force characteristic. Over three-quarters were Australian born and as a group the respondents were relatively low income earners. Half of the respondents were non-

problem gamblers, whilst just less than a quarter were problem gamblers. Problem gamblers were disproportionately more likely to be female.

Just over half of these regular gamblers gamble on gaming machines weekly, with sixteen per cent doing so more frequently. Gambling sessions are quite long on average (1 hr 22) and a similar amount of time is spent on average on each venue visit. Respondents thus spend a substantial amount of time on average each time they visit a gaming venue.

A large proportion of the respondents don't spend very much money on gambling each time they visit. Six out of ten spent $20 or less on gambling on each visit. However, around two out of ten spend more than $50 on average on each visit. Around fifteen per cent of respondents reported always or often terminating their visit only once they had lost all their available money.

Respondents overwhelmingly preferred gambling on one-cent credit value machines. One-dollar machines and two-cent machines were the next most, and equally, popular. Respondents' favourite machines were Indian Dreaming, Dolphin Treasure, Shogun and Treasure Chest. These machines matched closely the 'best performing' machines in terms of expenditure described in Section 2 of this Report and those mentioned by participants in qualitative data collection (Section 4). No significant difference was found in the preferences of problem and non-problem gambler segments in terms of favourite machines. However, it should be noted that there was a trend toward significant difference between the segments in the case of Indian Dreaming and that the result for this machine was noticeably distinct from that for each of the other machines.

The majority of gamblers preferred to make minimum bets on multiple or maximum lines. Problem gamblers were statistically less likely than non-problem gamblers to make minimum bets on multiple lines, however. Problem gamblers were disproportionately over-represented amongst those making medium sized bets on multiple or maximum lines. This was an interesting result in light of the existing literature on the mini-maxi betting style and also in relation to the qualitative research conducted for this project (see Section 4).

In terms of the attractiveness of gaming machines, respondents were heavily attracted to reinforcement amongst the structural characteristics. Respondents were most strongly attracted to large payouts, frequent payouts and free games. In comparison, game features and multiple line betting were less attractive amongst fundamental structural characteristics. Respondents were also less strongly attracted to a range of design and presentation features. Respondents found the music and sound of gaming machines unattractive.

As was expected there was no significant difference between gambler segments in terms of the attractiveness of gaming machine features. The sole exception was a significant difference between problem gambler and non-problem gambler segments in relation to music and lights accompanying wins. This result supports previous qualitative research (AIPC 2006) that found that problem gamblers do not like to draw attention to themselves in gaming rooms. As is described in Section 4 of this Report, this was also the case amongst problem gambler participants in this project.

Respondents in the problem gambler segment were more likely than non-problem gamblers to:

- gamble 2-3 times per week or more;
- gamble for more than one hour;
- not spend an hour or more on other activities in the gaming venue;
- spend larger amounts of money; and to
- end their visit to the gaming venue after all available money was exhausted.

In terms of identifying those structural characteristics of gaming machines which may lead to adverse gambling consumption outcomes, it is clear that reinforcement is central to the attractiveness of the gaming machine product. The survey found that four machines are clearly the most popular amongst gamblers. As Section 2 described, this is in the case of some games, a function of the ubiquity of these machines and their location. However, as is discussed in Section 5, the operations of these different machines produces markedly different consumption outcomes depending on their credit value and the average bet made. Several of the findings of the survey appear relevant to understanding the configuration of consumption, particularly in relation to excessive gambling, as will be highlighted and discussed in Section 5.

4. Researching EGM game features with problem gamblers

"It's like reading a really good page-turner, you don't want to put it down. It's so engrossing you always want to turn the page and find out what happens next…".

This section reports data collection conducted with problem gamblers in South Australia regarding EGM game features and gambling strategies. Previous research undertaken into EGM technology (AIPC 2006) has placed games and machines at the centre of analysis, shifting respondents into the position of 'experts'. Valuing the opinion of problem gamblers about the operations and attractiveness of gaming technologies can transform the research dynamic. However, de-centring the gambling subject, by focussing on gaming technologies, enables participants to talk about gambling without necessarily having to talk about themselves. By placing technology at the centre of the data collection strategy, individuals' gambling histories and experiences emerge indirectly, as they tell stories about their gambling. These stories seem to be essential for respondents to contextualise their accumulated experience and knowledge of EGM technology for the researchers.

4.1 Methodology and related issues

The researchers adopted an 'information-oriented' approach to recruiting a sample of problem gamblers, seeking to maximise the value of the information captured from a relatively small but 'information rich' sample. This was neither a stratified nor a representative sample. The researchers approached the Break Even service network in South Australia (via their network co-ordinator) to assist the project. Arrangements were negotiated with a number of individual agencies providing Break Even services, who facilitated consultation with counsellors and management and recruitment of problem gamblers to participate in data collection. Participants were remunerated for their time, being provided with a $25 voucher from a leading department store.

Human research ethics approval was obtained prior to the commencement of participant recruitment. Approval was obtained from the La Trobe University Human Research Ethics Committee and, in respect of research involving gamblers recruited via the Flinders Medical Centre Intensive Problem Gambling service, additionally from the Flinders Clinical Research Ethics Committee. Participants were recruited in range of metropolitan, regional and remote settings (see Appendix A).

Table 4.1: Participant recruitment locations

Inner Metropolitan	Adelaide
Outer Metropolitan	Flinders University MC, Hindmarsh, Kilkenny, Salisbury
Regional	Port Lincoln, Port Pirie, Mt Gambier

A total of 64 respondents were recruited for nine focus groups and fourteen individual in-depth interviews. This is a relatively large number of participants for such a qualitative data collection, particularly with self-identified problem gamblers, and more particularly in the context of a synchronic (snapshot) study.

Table 4.2: Summary characteristics of the qualitative sample

Gender	64.5% female; 35.5% male
Age (years)	24 youngest; 73 oldest 48 median; 48.3 average age
Country of birth	68.9% Australia; 19.7% United Kingdom; 11.4% others
Locality	Metropolitan 67.7%, Regional 32.3%
EGM gambling participation (years)	3 shortest; 32 longest 10 median; 10.8 average
EGM gambling problems (years)	1 shortest; 32 longest 6 median; 7.3 average
EGM gambling expenditure ($/session)	$10 low; $1,500 high $200.00 median; $282.90 average
EGM gambling duration (hrs/session)	1 low; 8 high 4.0 median; 3.8 average
EGM gambling sessions (n/week)	1 low; 12 high 2.5 median; 3.1 average
Other gambling forms participation (n)	16 (34%) participate in other forms of gambling Lotto 75%, scratchies 25%
Other gambling forms problematic (n)	Other gambling forms are a problem for 2 of those who participate in other forms of gambling (12.5%)
Occupation/ labour force status	21.0% home duties 11.3% health worker 11.3% pensioner (disability pension, 8.1%) 11.3% professional/ semi-professional/ manager 11.3% sales/service worker 8.1% retired 8.1% unemployed 3.2% office worker 4.7% other blue collar 1.6% labourer/ building & construction

The sample of respondents was biased toward females. More than two-thirds of all respondents were born in Australia. The average length of time the respondents had been consumers of EGM gambling was 10.8 years, with the median period for the group being 10.0 years. The median duration of problematic gambling activity across the group was 60% of the total time respondents had been gambling on EGMs. The average amount of money and time spent participating in EGM gambling was substantial. The medians show that the majority of participants lost smaller amounts. The range of expenditure per session reported by participants reflects the fact that the level of gambling losses varies widely between individuals. This is no doubt dependent to a large degree on access to money (income, savings), wealth (assets) and access to financial products (borrowings, credit cards) etc.

The focus groups and interviews were conducted in a relatively informal atmosphere. In all but one case (which was undertaken by telephone) they were undertaken at the premises of the Break Even service with which the participant was familiar. In most cases two researchers

were present and interviews were audio-recorded with the explicit consent of participants. In all cases the researchers also made careful notes. A list of venues at which focus groups and/or interviews were conducted is attached as Appendix A. Participants initially completed a basic information sheet, and discussions were then guided with reference to a schedule of issues and questions. Both of these documents are attached at Appendix B. However, the schedule was employed as a guide and checklist rather than rigidly administered in the form of an instrument.

The participants were considered to be 'expert informants' – that is, highly experienced EGM users well placed to respond to questions focused on the study's key research questions. Respondents were directed toward discussions that would frame those aspects of EGM operation they find most appealing and/or likely to exacerbate their tendency towards excessive or problem gambling as the core discovery objective. Commencing by objectifying EGM technology oriented the participants to the precise focus of the research. However, in many cases this did not lead directly to useful data emerging about games or machines. Often, after this initial process of focussing on EGM technology discussion would turn to the narratives of individuals gambling histories or 'careers'. Many participants wanted the researchers to be able to 'make sense' of how their involvement in EGM gambling had unfolded. Participants were keen to contextualise their gambling behaviour in relation to life-course events, which included in several cases large financial windfalls such as redundancy payments or inheritances. The researchers then approached the question of particular games and their features obliquely. In the course of discussions participants would be encouraged to specify in detail particular gambling experiences, including the operation of particular machines and their gambling 'strategies'.

The status of the participants as 'problem gamblers' was based on their self-identification and formal help-seeking behaviour. All the participants were currently, or had recently been, engaged in problem gambling counselling and/or support activity at the time of their participation in focus groups or interviews. Approximately half the participants had sought help with gambling problems on multiple occasions. The researchers did not administer any problem gambling screen or otherwise apply any diagnostic criteria to assess the 'problem gambler' status of participants.

The fact that participants had sought help and engaged with counsellor about their gambling is likely to have some bearing on the research process. Participants are likely to have already discussed the operations of EGMs as part of their counselling program. That is, participants had already 'objectified' EGM technology to some extent, and had perhaps adopted learnt perspectives on their operation as a new set of 'facts'. These facts were to some extent explicitly designed to 'overwrite' their own beliefs and accumulated experiences as part of their 'treatment'. The researchers found that there was thus a need to be reflexive in assessing the testimony of participants from the point of view that this testimony also included at times the 'voice' of counsellors, researchers and other sources of knowledge or information about EGM technology. The researchers endeavoured to step past this 'reformed' knowledge of the facts about EGM gambling, principally by commencing discussion of respondents' techniques for playing machines. The fact that many participants had established counselling relationships on one or more occasions previous to their current help-seeking activity, was a sign to the researchers that becoming apprised of the 'facts' about EGM gambling has very limited efficacy in relation to problem gambling treatment.

Data collected through the focus groups and interviews can thus be considered as having been obtained from a sample of paradigmatic cases. A paradigmatic case refers to the reported experiences, beliefs and perceptions of relatively well-informed participants that highlight global characteristics of a particular social issue or research question. Such qualitative, small-sample approaches are criticised for supposedly not providing reliable data to support general statements about the nature of relevant phenomena, and for their lack of 'quantifiability'.

However, provided a circumspect and measured approach is taken to the drawing of conclusions and implications from such a research approach, the researchers believe such criticisms may be readily countered. For example, if most participants in our sample independently suggest that flashing lights on EGMs are attractive to them in choosing to play a particular machine, then these data have global significance, in that flashing lights are likely to be a factor in the marketability and attractiveness of poker machines, and more particularly in respect to their relative attractiveness to problem gamblers. However, if we were to extrapolate from such qualitative data to argue that a particular proportion of problem gamblers are attracted by flashing lights (by estimating the proportion of our sample who report this), such an estimation would amount to an unreliable generalisation.

A thematic summary of qualitative data collected is presented below. Whilst the researchers are firmly of the view that the consumption of EGM gambling is a highly socially and spatially contextualised phenomenon, for analytical purposes every attempt has been made to separate out data directly relevant to the actual features of EGMs from that pertaining to the contexts which are irreducibly part of EGM gambling consumption. As described in the Introduction, the terms of reference (TOR) for this study are limited and focussed on EGM technology. Whilst the researchers approached qualitative data collection via specific questions about games, machines and playing strategies, the experiential basis of the data being collected inevitably meant no such clean line could be drawn within the testimony of participants, whose everyday lives, social contexts and life-course events were irreducibly constitutive of their gambling stories. Accordingly, the thematic analysis that follows is broken in to two main sub-sections. The first sub-section deals with qualitative data and analysis proper to the project TOR. The second sub-section highlights other emergent themes that, whilst not directly addressing the TOR, are drawn to the IGA's attention for purposes of information and understanding.

4.2 EGM technology: Problem gambler accounts

"The gaming machine is the only reason why anyone is in the room".

There was great diversity in the way in which relevant data emerged from the qualitative interview cases. Many respondents were able to objectify EGM technology and describe and discuss its various qualities and features through a rationalised discourse that broke EGMs down into their component parts. Other respondents engaged with questions about technology via a more intuitive and holistic discourse, which emphasised the sum of the parts rather more. Some talked about EGM technology in terms of an intricate knowledge of game features, whilst others were more focussed on the overall 'mystique' of a machine. Another small group of participants were less comfortable in directly articulating their knowledge of EGM technology. However, in most cases the testimony of these respondents was no less valuable. This was particularly the case in relation to the strategies used by participants to

achieve their objectives. The descriptions and discussions emerging from the qualitative data collection process are summarised thematically below.

4.2.1 Favourite games

"They're our friends".

Dolphin Treasure was the game most nominated as their favourite EGM by participants (n=22). Dolphin Treasure is manufactured by the Australian gaming machine manufacturer Aristocrat and has been a staple game throughout the Australian market. Dolphin Treasure has been in the marketplace for many years and most participants reported a strong preference for earlier versions of this game (Aristocrat's Mk IV platform), rather than more recent versions. Many participants reported a perception that Dolphin Treasure gave better odds of winning, or of winning big, because odds are tripled during the free game feature. Participants were also of the opinion that there were more Dolphin Treasure machines in venues than any other game. A number of other games were also identified as favourites, as shown in Table 4.3 below.

Table 4.3: Participants' favourite EGMs (n)

Dolphin Treasure	22
Indian Dreaming	8
Hearts or Sweethearts	6
Black Rhino	4
Mermaids	4
Adonis	3
Shogun	3
Queen of the Nile	2
The Pyramids	2
50 Lions	2
Old Blue Moon	2
Big Ben	2

The tension between boredom and interest involved in substantial consumption of EGM gambling was evident in discussion of the relationship between new EGM products and familiar machines, and between older and newer versions of a particular EGM. One participant summed this tension up: "It's quite boring playing pokie machines, you need something to keep your attention, newer machines keep you more involved, giving you smaller pays to keep you going". A small number of participants reported a preference for newer machines (6), as they advised that they "got sick of" the older games and that using newer machines "would break up the boredom a little bit". Others believed that new games were often set to pay out early to encourage customers: "Each time they bring in a new one [machine], it seems to be paying, and then that sorts of dwindles, dwindles, dwindles, and then that's it…". One participant liked "the challenge of working out the series" of a new game, however, as in previous research (AIPC 2006) there did not seem to be a great level of curiosity amongst problem gamblers to explore the full range of possibilities that an EGM

might offer. Rather, familiarity was an important aspect of using a favourite machine and being "comfortable with what I'm playing".

A common or readily identifiable reason for gravitating to a particular machine did not emerge. A substantial number of the participants felt attached to the machine on which they "learnt the ropes". The arbitrary nature of adopting an EGM was summarised by one participant who described the appeal of favourite machines, saying they "just take your fancy like a dress in a window". Many respondents revealed an almost forensic knowledge of the locations where their favourite machines could be found and/or of those that were the most favourably situated in the context of the gaming room. The placement of machines in secluded, quiet and relatively private positions within venues allowed a better enjoyment of a favourite machine.

A number of participants had quite specific reasons for favouring a particular game. For example, Indian Dreaming was preferred by one participant because "you don't have to get three in the scatter feature you can get the tepee substitutes". The value of substitutes were their better odds "tepees are x5 in the free games then x3 so that equals x8". This respondent would also occasionally play other machines but didn't really want to. "If Dreamweaver credits are up high you're always going to keep playing".[13]

Some respondents identified a handful of different machines as favoured and discerned differences amongst them. For example, one participant said that Enchanted Forest had good substitutes but these were not as popular with gamblers as the free spins on Dolphin Treasure. At the same time he liked Adonis for its "good games within games" but was perceived as "more risky". Alternatively, Queen of the Nile was simple and clear to play but "was not the best paying" so he often played two Queen of the Nile at once – "its not allowed anymore but many gaming rooms are separated off so you still can sometimes". Another participant said they preferred Bird of Paradise and Helen of Troy because both "give you a little bit to keep you there".

A number of other participants reported that they *only* played their favourite game (n=12), and nearly all stated that if their favourite game was not available they would go to another venue where the game they wanted to play was available. As one participant put it, "Why waste your money on a machine you don't like?" Some participants (n=9) pointed out that they felt uncomfortable waiting for a machine to become available because "people stare" at you, a reflection of the discomfort participants report when people overlook them, or stand near by and scrutinise their play.

Gamblers were prepared to travel to access favoured machines and/or well positioned favourites. One respondent described preferring a particular Aristocrat EGM on an aging Mk IV platform, of which there were only three examples within his inner city walking radius. Not only did he not gamble on later versions of the game, but he would move around the three venues where the old version remained until he found one free and would not start gambling on anything else, although he might move onto other EGMs later in a session. Another participant described how she would walk into a venue and if her favourite machine was not there she would "turn round and walk straight back out again".

[13] This respondent referred to her favourite machine as both Indian Dreaming and Dream Weaver.

Although explanation for the adoption of particular machines as favourites was not clear-cut, in the process of conducting the data collection the researchers started to form a view that early experiences were relatively important in structuring ongoing EGM preferences. The experience of "learning the ropes" was definitely important. The high proportion of Dolphin Treasure machines in the market and the frequency of its citation as a favourite supported this hypothesis to some degree. Clearly early wins are also important in this regard: "you tend to like a machine if you've won on it". It was also clear that 'knowing where you are' with a particular machine was a mode of engagement more favoured, or favoured more of the time, by these gamblers in comparison to a more exploratory or uncertain modality. Many participants spoke of their familiar and favourite machines in a proprietorial way. As one participant reported, she had seen friends get angry at not being able to access their machine. Such machines, it was a common line of thought, just "become yours".

4.2.2 EGM game features

"They are important, that's what you wait for, because why else do you play the machine? Just to see it spin? You want the free spins".

Contemporary EGMs are designed with a range of features, some of which are relatively unique, but the majority of which are generic. As discussed earlier, the SA EGM market is quite particular in that there appears to be a slower turnover of product than in most other Australian jurisdictions. There also appear to be large numbers of particular games (most notably Dolphin Treasure) in the marketplace. These factors are relevant here in that the testimony of participants was overwhelmingly centred on one particular game feature – free spins.

A large majority of participants found the free spins feature most attractive (n=51). Many seemed to choose their machines according to what they believed it could deliver in regards to free spins. The odds paid out on wins during free games were perceived as an attractive element of Dolphin Treasure, which was consistently cited as delivering the most free spins - "the game has good credits on it" – and providing better chances because "free games are tripled betting high…and the upgrades of Dolphin Treasure still pay out okay too". The greater odds paid during free spin features "are great because you think you're going to have a *big* win in them".

The overall appeal of free spin features had two main components. The first was the sense that the EGM was itself paying for the games, rather than the gambler. "With free spins there is the perception that you're getting the computer's money, it's not your money, you're getting money back from them". Others commented that with free spins "you would get your money back", or were "winning something for nothing". Some respondents clearly articulated a sense that despite losing overall, at least for a while you were "playing on their money".

A second dimension, that of getting extra time on the EGM, was also very apparent and highly valued in the discourse of the participants. The attraction of free spins appeared to rest just as much on a perception that they would enable one to play longer; so that one would "get extra minutes sitting there". As another participant put it, you have to "buy more time". Another described how "when you get them [free spins] you're totally relaxed".

However, the accentuation of EGM display features that occurs with the free spin feature was regarded as overly exaggerated in one case: "when you get free spins on Indian Dreaming, the tone of the machine is really loud, you can hear it from the other side, why is it up so loud?".

Mention was made by some participants of other game features, included scatter features and 'bonusing' games. Some participants reported that they 'liked' jackpot games (n=8), although jackpot games were not cited as the preferred game by those participants. Those who had liked jackpot games reported that they had at some time had a big win on them. "Mystery Jackpot", "The Golden Nugget", "Queen of Arabia" and "Cat" were reported as favoured jackpot games. Other participants reported that they were not interested in jackpot games because the pictures were not appealing ("dull graphics") and they did not pay out much.

It was noticeable that participants tended to move to discussion of scatter, jackpot, progressive and other features only following further prompting from the researchers. This was in contrast to the immediacy of reference to free spins when discussion turned to EGM game features. It is important to emphasise the point that free spins were foregrounded and accentuated by almost all participants. Other game features were comparatively inconsequential in participants' talk. One way of interpreting this would be that free spins are an aspect of EGMs that is recognised as attractive or desirable at a reflexive or cognitive level. Other aspects of EGM technology that are attractive to gamblers may operate at a pre-reflective level, or prior to higher levels of cognitive processing. A few participants said they were drawn to EGMs with multiple features - "the more opportunities there is in a game, I tend to be drawn towards it". However, what was most clear from discussions overall was the key role of free spins in attracting, exciting and rewarding participants in the course of their EGM gambling consumption.

4.2.3 Sound and music

"It's exciting, you put your money in and you've got to wait for three Geisha's, or three gateways, or the three nuggets, and it has that deh, deh [music], and you're waiting to hear that third one".

The music and sounds of EGMs were reported as being attractive characteristics by some respondents (n=24). The sounds associated with winning on a particular game were particularly welcome. "I like the chicken one ... and the egg cracks open and the chook comes out, and it has that music [sings the chicken dance]". "I love the Genie one, you have to get the lanterns, that makes a big noise". "The free spin music, I dream about that". For many respondents the music features of games were thus important in signifying success: "I like it when it's going long [the music], because you know you're winning plenty of money. When they're short, I don't like them".

There seemed to be some ambivalence about the sound/music features associated with winning, however. Several respondents observed that the problem with the sounds machines made was that they drew attention to you. One said, "sounds are too loud and attract attention. If someone lets the feature music go on and on they are not serious – the problem gamblers hate hearing it go on and on – and it draws attention to you". A number of participants (n=10) thought along these lines and did not find the music attractive or relevant, mainly because it was either "annoying", or would attract attention. A few other participants also reported pressing "collect" straight after a win specifically to stop the music from playing. Others felt

the impact of the music was negative because it "creates the illusion that everyone is winning but you".

One respondent described hearing other peoples' machines "going off" as presenting a dilemma. "You can go either way when you hear somebody else going, you can get all hyped up and think, gee their machine's going I could also have it, or it could go the opposite, why isn't my machine paying. It has a double affect". A few commented that the music would "get people going", would get you "excited", "you would hear the wins around you, it would make you try harder". Others reported being attracted by the sound of other machines paying out: "The minute I hear the 'ching, chong China man', I quickly run around to see".

Some thought that there were significant psychological or emotional effects that stemmed from becoming attuned to EGM music. Two participants reported that it was "hypnotic". A number of participants noted that the pitch of the music was perceived as changing when the game "was about to pay out", and this had an effect on their playing, "you'd look around to see who was winning". Two participants noted that the music made them "anxious" and "desperate" as they believed that everyone else around them was winning something, when they were not. Some participants reported hearing the music in their sleep, "you wake up and it's in your head".

Taken to its extremes a number of participants reported being 'haunted' by the music of poker machines. One said that they would hear the music from the street – "it's calling me". One participant felt "there must be something to do with the music, because I used to go to bed hearing it, I'd dream about it, I'd be on the bus and it would come to me".

The music and sounds associated with EGM gambling thus had a significant impact on the participants. This impact was often ambivalent for individuals. The researchers formed the view that the associations of particular emotions with EGM sounds and music varied, but had a general tendency toward discomfort and stress in later stages of individual gambling histories. Initially EGM music was a familiar and enjoyable aspect of gambling that helps gamblers to become fully involved in their machine (see later discussion of 'the zone'). However, these effects appeared to decline over time. This was evidenced particularly in relation to gamblers' need to mute the music associated with wins to avoid attracting attention, yet being torn or inspired to gamble more when music from elsewhere in the gaming room signified that others were having success.

4.2.4 Artwork & design

"The bright colours I find attractive. And it could be the same game in a different pub but their screen is not giving up such a bright colour, I won't stay there because it's not giving me the fix or the high".

A solid number of participants (n=25) believed that game artwork had an impact on whether a game was attractive to them or not. These participants liked machines that were "bright" and had "pretty colours", the game has to have "eye appeal". Many of the popular favourite games were cited as attractive although the graphics of Dolphin Treasure were described as "boring" by a couple of respondents. A smaller group of participants (n=11) believed that game artwork had no relevance to the selection of games they chose to play.

In the course of their discussion of different games particular iconic images that are integral to specific game designs were described, For example, “the blue eyes” of Enchanted Forest. Many of the iconic images were, however, not necessarily associated with a particular EGM by name. One participant said they “liked the ones that were funny, like the Hippo one that goes, bounce, bounce, bounce, bounce”. Another said “I love the Genie one, you have to get the lanterns, that makes a big noise”.

A number of participants (n=15) reported that the characters and/or symbols portrayed on the virtual reels contributed to the attractiveness of the game, many making comments about the characters of their favourite games like, “the mermaids were beautiful”, the trolley buses - “they get you in, they’re cute”, “cute horses” and “dolphins leaping and chattering”. Some participants reported that they liked machines that had characters that “entertained” and made them “feel good”. One participant reported that if she saw a picture of a Geisha or dolphin she would think about EGMs, and would want to go and play. Other participants had formed the habit of ‘stroking’ some symbols (such as the fins of the Dolphins) to make them feel good, and thus bring good luck. Only a few participants (n=4) reported that the characters and symbols were irrelevant, one participant stating that he found some of the characters “annoying”.

The name of the particular games had no reported relevance to whether people would play a particular game. It was very common for participants to have some degree of difficulty in recalling the exact name of their preferred game, although they had little trouble in identifying their favourite machine by describing the artwork, character or symbols it featured.

4.2.5 Gambling strategy

“You take on that machine until it’s over”.

Previous sections have focussed on what makes particular EGMs attractive. A gambler has a choice of different EGMs and different credit values are often available for each game. However, once a gambler settles on a particular EGM their major choices are restricted to two, the bet size and the number of lines on which to bet. This forms the basis of the gambling strategy, along with subsequent decisions about when to raise or lower selected bet sizes or lines gambled and whether to take up double up/gamble or take win following receipt of a prize. The gambling strategies used by the respondents fell into two main classes: decisions about gambling parameters; and other measures intended to influence machine outcomes.

As we have earlier discussed, a consensus has started to emerge in research literature suggesting that problem EGM gamblers will tend to bet on all available lines. This appears to be a response to the ‘near miss’ effect stimulated by the appearance of winning symbols on virtual reels. Generally, participants reported deploying strategies according to this tendency reported in the literature (see for example Walker 2004), underpinned by the belief that this approach would enhance their chances of getting free spins or a big win. Many participants said their most common pattern was to bet minimum credits on maximum lines (mini-maxi). However, this strategy would incorporate variation in bet size according to cash status, machine events and anticipated length of the current session. Almost all participants selected maximum lines, reporting that they did not want to “miss out” on a winning combination appearing on a line they weren’t playing.

Almost all of the participants could articulate actively 'strategising' to "beat the machine", particularly anticipating ways to trigger free spins or to "win big". "You get to read when they are going to pay out", as one participant expressed this sentiment. Many would increase or reduce the quantum of their bets to try and "fool the machine" or "wake up the machine". Some participants believed that using special "triggers" or following a betting pattern would influence the machine or improve the chances of a win, and this strategy would change from game to game. The most common tactic adopted by gamblers was to reduce the number of credits following a win, and to increase the number of credits as the number of spins since the last reinforcement occurred. As one respondent put it, "strategy is when to up your bet – not just when you are desperate to win".

There were a variety of exceptions to this pattern. One participant, who played Shogun, would play max lines at $1 each line, increase it to $3 bets, then after a free spin would drop to $2 a line, then jump back to $3. Another participant explained that she would count the number of treasure chests that would 'surface' and believed that after the 50th treasure chest the prizes would come up. Only a few gamblers would go in with large sums of money and "blow it all" in short order (i.e. max-max on a $1 machine).

A female respondent said that she would "play only one or two line, but occasionally move up to three lines". She also had a different view of when raising or lowering bet levels was appropriate, explaining that "if credits are increasing you should reduce you bets as it's fixed into the reels that no free games are going to come out".

One regular Dolphin Treasure gambler said that his strategy was very consistent. "I can calculate the odds of potential winnings and I know how the machine operates, I know what I have to get and how best to get it – I never experiment". This participant preferred to use a 2 cent credit value version –"it's not too bad" – and always plays maximum line and maximum credits. However, he wasn't entirely happy with this practice, stating that "I want to limit myself to 5x5 (credits x lines) - that would be safer…".

Another gambler said you needed to get a sense for "where a machine was at". He explained that "it is random where the machine is at", but "you know the machine has cycles" – and so some do pay more at certain times…". He also argued that "there are triggers you can use to improve your chances, I didn't like altering down but if you drop from say 90 to 70 on Dolphin Treasure then it seems to pay out more often – it happens a lot of times, same with switching a bit 75-100 on Queen of the Nile".

Most participants wanted as much playing time as possible and would alter their bet sizes, or "buy their time" accordingly. Almost all participants thus stated a preference for using 1 cent (n=46) or 2 cent (n=19) credit value games, overwhelmingly reporting that this would allow their available money to last longer, in turn allowing for longer periods of 'time on device'. Two participants said that they played either 10 cent or 5 cent machines. Three participants preferred playing $1 (Shogun) machines because they "wanted to win big" and felt it was useless playing on the lower denomination machines. Some participants (n=10) reported that they would occasionally use $1 machines, but only if they had the money, or perceived that they were on a "lucky winning streak".

Another reasonably typical description of strategy came from one participant who always played maximum lines but minimum credits, "rarely over two credits", always using one cent

machines to express the preference of "buying time". There were "some rare occasions when I'd dabble on the $1 machines when I was on a roll". However, this respondent also said "you do learn" about particular machines, and cited the example of Mermaids - "you could tell when it was going to pay, and you could hold down [the] button". This relatively typical gambling strategy (at the level of bet sizes and the number of lines to play) also incorporated erroneous cognitions: "You get to read when they look like they're going to pay – the reels go fast…Normal people probably wouldn't know to watch the reels closely".

Respondents used a range of other strategies to try and influence EGM outcomes. Many of these approaches were apparently part of personalizing machines to some degree. These included: talking or swearing at the machine; rubbing the machine's 'belly'; kicking the machine; and patting or touching the screen (particularly stroking characters on the screen, such as a dolphin or the dolphin's fin). Some participants commented that they would generally not move from their machine if they had not had a win because they did not want others to take the winnings which they had "worked for". Participants said they would reserve their machine if they had to leave it temporarily (for example to get more money) for this reason.

No respondents reported having a successful strategy for bringing a gambling session to a close. A clear majority of participants (n=44) reported that a gaming session would only conclude when they had run out of money. "You just go and get more money and come back", and "[I'm] not satisfied until I've used everything" were typical of participants' comments. Most participants told us it was rare or uncommon for them to leave a venue with money, and those who had the self-control to leave with winnings, generally reported that they would come back the next day or the next opportunity (often on the same day) and gamble it all. Many (n=21) would visit ATMs in order to get more funds to continue gambling. Running out of time was a less commonly reported reason for ending a gambling session (n=11) and was usually due to other commitments (e.g. an appointment, picking up kids from school). A small number of such participants told us they would miss appointments because of "losing track of time". The balance reported that they would stop gambling to meet such appointments.

A small number of participants (3) reported that a venue closing would end a gaming session, but as one participant reported, "if the venue you're at closes, you just go to another one, you jump from venue to venue". One other told us that he would sometimes go to a venue he knew would close soon to limit his gambling, although this had limited effectiveness given the availability of other venues. Two people told us that they would end a gaming session if they became "tired", or "felt sick".

Overall, respondents most commonly tried to anticipate the winning of free games or other features and increased their bet size to take advantage of the better odds in free game features or the prizes included in feature games. They clearly related this process of scaling bets up and down to chains of preceding and anticipated machine events.

4.2.6 Escaping into the zone…

"The feeling does not start when you're in front of the machine, but when you've made the decision that you're going to go".

"I would say I was 'out of it'. You become absorbed in all the little rituals".

Participants were asked what they liked about the overall experience of EGM gambling consumption. Responses suggested that gambling on EGMs can provide stimulation and relaxation for gamblers at various times. Both of these were part of the "escapism" or "escape from life" that was the most common reason participants nominated they liked about EGM gambling. Almost all participants talked about wanting to "zone out" from their everyday worries and troubles. For many, playing the pokies was their only escape, "it's where I went to get away from everything", and was a "mindless activity" which allowed them to "not think". EGM gambling gave participants a chance to "relax", "chill out" and have "time out" without interference from life (family, friends, work, etc).

For some it was a "pain-killer" which helped them cope with more devastating emotions, linked to traumatic life-course events such as the loss of a loved one or a relationship breakdown. It was also described as a cure for boredom and loneliness ("it is freedom from boredom") and an activity which could be done alone but in the presence of others ("it's company without company", "it's an activity I could do alone"). The longer participants could stay at the pokies the better, "winning straight away is no good, you're there for a poke (sic)"; "Hell, I don't want to win now, I want to keep playing!".

The experience of 'the zone' can lead to a significant level of disengagement. "On a binge it's just like 'being in a trance' – you wake up in the night and say did I or didn't I?". Several respondents made comments to the effect that they enjoyed gambling on EGMs because 'no one argues with you, no one contradicts you' and you 'forget personal hassles'. Another said "you just get consumed in it" with "time just disappearing". Another recounted an experience of being in the zone that transformed over time and was associated with changing emotional states – "starting from happy anticipation but then you start to plead, envious of those who could play just for fun".

At least two respondents had suffered extremely negative experiences of the zone. One described the effect of the games as "mind-screwing", and associated with confusion and palpitations. "It's distressing because you are totally fixated – aware but out of control. You get hypnotised. I swore that I saw the mouth on the Indian's face move on the machine. I knew I was hallucinating. I knew it was the hypnotising effect but swore that it really happened." A second respondent suffered physically debilitating effects. "You just lose yourself – it's a different world without any interference. Afterwards you feel so sick at how much you've lost but at the time it doesn't really enter your head. I've been physically sick afterwards…".

Another significant but less well-supported reason some participants liked EGM gambling was the "rush" and "buzz" they felt when they had a "big win" or the anticipation of winning ("its so engrossing you always want to turn the page and find out what happens next", "it's the thrill of the win"). Many participants spoke about feeling exhilarated prior to (even days before) a gambling session, and during the session. One participant reported that he would "stay awake all night before payday in anticipation [of gambling at the pokies]", another stated, ", it's a real buzz walking in there". Many participants described feeling elated when they got free spins and a payout, "it's a very good feeling when you win – it's the reason you go", another participant described how this "becomes your exhilaration in life". One participant likened the intense excitement that he feels when gambling to his first sexual encounter. Some participants stated that it was the "thrill of the chase" that kept them going

back, "I enjoy the competition", it's great to beat the machine". There was a sense from gamblers that they felt that they "deserved" to get paid out, "I am not leaving till I get it".

Participants were thus divided into those for whom the primary experience is related to an escape from the problems of daily life, an entry into 'the zone' where difficulties are negated. This appears to be the largest group. The other group are those for whom the most rewarding experience is associated with the prospect of winning. These groups are not mutually exclusive, but most participants who enjoy the experience of 'the zone' appeared not to be substantially drawn by the prospect of winning, and most for whom the prospect of the win is paramount were not substantially familiar with 'the zone'.

It is important to note that despite participants enthusing about how EGM gambling provides them with an escape into the zone, or an exhilarating rush towards a (probably unfamiliar) feeling of winning, all participants acknowledged the negative consequences of their gambling, and the emotional "rollercoaster" associated with EGM use. As one female participant observed, "afterwards you feel sick". Another summed up the process from commencing gambling in EGM gaming venues to eventually seeking help from counselling services in the phrase "You go through every emotion in the book from that door to this door".

In summary, the experience of the zone appeared to be one in which the array of EGM characteristics came together to provide a 'disconnect' between the individual and other external perceptions. The experience of being 'out of it' appears to rely on a range of machine attributes, game features and is articulated by respondents as a particularly 'mental' experience. However, it should not be overlooked that the repetitive embodied movements that sustain interaction seem to not intrude on this experience. This would support the sense that the physical requirements of EGM play, unlike the older mechanical machines, do not irrupt into the temporal flow of 'the zone'.

4.3 Other themes emerging from qualitative data collection

A number of contextual factors relevant to the preceding discussion of EGM features emerged in the course of the qualitative data collection. These are summarised here under two themes, the venue settings and social contexts in which EGM gambling consumption occurs.

4.3.1 Venue settings of EGM gambling consumption

It is possible, and in our view highly likely, that the internal features of EGM venues are likely to exacerbate any tendency towards the problematic or excessive use of EGMs. There are a number of possible reasons for this. Firstly, there are substantial distinctions between the way venues are arranged and decorated, their accessibility varies substantially, and many venues offer inducements such as free drinks or snacks, and prize draws for frequent users offering TVs or similar goods as prizes. In some cases loyalty programs are offered. As one respondent said, "Promos are fatal – if you win 200 credits then go and spin the wheel to win other prizes, you'd up the tempo and get more determined".

Some venues lay out their gaming room in a relatively open plan style, but many others arrange EGMs in such a way as to provide 'cover' for those who may not wish to be observed by others whilst playing them. It is not uncommon to observe a row of EGMs placed at the rear of a gaming room, obscuring any players who may be using them. Indeed, it is often the

case that, on looking into that section of the venue, the observer will see a substantial concentration of players using EGMs located in that row, even though other EGMs are available in the more visible section of the room. It is hard to escape the conclusion that provision of such comparative lack of visibility arises from consideration of player preferences.

Additionally, some local venues have an almost palpable 'atmosphere' highly reminiscent of a casino or other comparatively 'glamorous' venue. Others present a more 'run-down' environment. In observations undertaken for this study, we note that hotel venues are generally rather more accessible and provide a more intense atmosphere than club venues, although this is not universally the case. In the South Australian context, however, hotels are much more accessible than club venues, if for no other reason than the clear preponderance of EGMs located in hotels (around 90% of the EGMs in South Australia are located in hotels, and about 90% of hotels have EGMs).

Our discussions with EGM users have tended to highlight the importance of the player's relationship with his or her favourite machine. But this relationship is very commonly also mediated by the quasi-social setting within which EGM use occurs. That is, some problem EGM users will move venues if their favourite game is unavailable. Most, however, reported frequenting a favourite venue or small group of venues, frequently within proximity of home or work, where they know the game they like is available. Thus although the prime relationship in the EGM transaction may be that between the player and the favoured EGM game, there is frequently a second and mediating relationship at work involving the venue within which the game is contained. This latter relationship is described as 'quasi-social' because players frequently report very limited contact with other people, and indeed actively resent any such interaction when the seriousness of their gambling escalates, yet experience the setting as social in nature. EGM venues are key sites of social interaction but this may often involve no conversation with another person, particularly for people entrenched in a gambling problem. Indeed, participants enjoyed being alone in the midst of the action, so to speak. The pursuit of anonymity, a function of the frequently expressed shame and guilt associated with problem gambling, was a prominent theme amongst participants.

The effect of game features on player behaviour is likely to be influenced to at least some degree by the environment within which play occurs. Indeed, our view is that the setting is probably of equal importance to many problem EGM users. An understanding of the role (if any) of game features in inducing excessive or problematic play should take at least some account of these factors. It is very likely that some EGM venues offer distinctly greater risks of enhancing EGM attractiveness and inducing excessive and problematic EGM consumption via aspects of their environment and related factors, and thus any attempt to regulate EGM use to minimise risks and reduce harm should be cogniscent of and directly address such risk factors.

Overall, pubs were listed as the most popular type of venue where participants liked to gamble (n=17), followed the casino (n=8) and clubs (n=6). However, generally, most participants reported frequenting venues where they could play their favourite games/machines, where they had previously had a big win or "lucky streak", and where they felt comfortable. Some preferred venues that provided a variety of machines, especially new games/machines.

A number of participants (n=17) preferred small and "quiet" venues mainly for three reasons:

- Fewer people in the venue meant that they could have their pick of machines, "you never need to queue for your machines" and there were less people to "look over your shoulder", one participant bluntly advised that "if someone was [standing] around or behind … I'd say piss off!"
- In a "comfortable" and "intimate" venue one could relax and unwind, "[I] could zone out and have some time out". One participant said it was a place "where I can be on my own and be as peaceful as possible".
- Anonymity was an important theme for many participants, who spoke about feeling shame and guilt because of their 'addiction' (n=15). In a quiet venue there was "less chance of running into someone I know" (n=4), "no one can see me or knows who I am" (n=2), "I liked to be hidden". Venues with a rear entrance/exit were also preferred by some participants (n=6) wishing to stay anonymous, as "you can go in one door and out the other and no one sees".

Smaller venues were also perceived to be "more secure" by some female participants.

A smaller proportion of participants (n=5) preferred big and open venues because there was "room to move", while only two participants suggested that venue size and atmosphere was irrelevant, as "the gaming machine is the only reason why anyone is in the room".

Some participants noted that good hospitality in a venue was important, particularly free food and drinks/coffee, "the bonus drinks were an incentive". Other giveaways like loyalty points and $3 lunches at pubs were cited by only a few participants as enticing.

Other venue features which were mentioned as important included a "nice smell" (referring to a venue which would frequently spray scented deodorant in the gaming room) (n=3), "relaxing", "warm", where there was a "stable noise" level, a "pleasant atmosphere", "friendly", "clean", long opening hours (n=3), and smoke free venue (n=4).

Many would frequent a particular venue(s) (n=14), and the location of their favourite venues(s) was largely based on convenience. Participants reported frequenting venues which were close to their workplace (n=9) or close to their home (n=8). A couple of participants reported that they preferred venues near shops or shopping centres, and another two participants frequented venues which were far away from where they lived. Some participants stated that they would rotate the venues they would visit so they were not identified by staff as having a problem.

Many participants (n=29) stated that friendly venue staff was important, many participants spoke about knowing venue staff, and staff knowing them on a first name basis. However, a few participants noted that they did not like it when staff were intrusive.

A number of participants (n=19) commented that they disliked people standing around them or talking to them while they were playing (including staff). One participant captured this in the following way: "[I] prefer places where they leave you alone", another told us that "I didn't like to be interrupted", and another said that "I don't come in to talk, I come to play". Most participants in fact did not want to be interrupted at all and found it "annoying" when people/staff came up to them and talked. Even people watching or standing behind them

while they were playing annoyed a number of participants, "I hated them watching me". One female participant told of how she disliked observers when she had lots of credits on the game. "I know they're thinking will: she cash out? And when they come back and you're down to nothing it's humiliating".

A number of participants also reported how they hated being recognised, and went to great lengths to remain anonymous. Remaining anonymous was a common theme in the stories told by problem gamblers, the desire to maintain anonymity being based on feelings of shame and guilt about problem gambling, and not wanting to be "revealed" to a partner or friends and family as someone with a gambling problem. One male participant reported that "I have left a venue if I became too familiar, if someone has said something, I feel uncomfortable". Another male participant reported that if he were 'caught' he would say that he had just ducked in for a quick poke (sic) and was on his way out. Another female participant reported that "I would never dress in bright colours if I was going to a venue".

The use of responsible gambling warning messages and information in venues were regarded as ineffective by problem gamblers. They were not discouraged or overly embarrassed by their presence. However, a small number said it was 'handy' to be able to get the number of the help line from a gaming venue.

4.4.2 Social contexts of EGM gambling consumption

Another important aspect of EGM use is likely to be associated with the way in which EGM users approach their time with the game. For example, consuming EGMs as an adjunct to a Saturday evening outing with friends and family may induce quite distinct patterns of play as compared with a furtive EGM session conducted during an extended pay day lunch hour, or a solo session on the way home from work. The circumstances of play are also relevant in considering the development of a gambling career. That is, the way one learns about EGMs may be characterised as a career path, with initiation via traditional social interaction accompanied by a low-key group EGM session, leading eventually to a more intense and private engagement with the game. We hypothesise that the circumstances in which one plays EGM games will also be closely related to the likelihood that certain features are germane to decisions about the pattern of play. In turn, this is likely to be related to the way in which some features of the game may be appealing in some circumstances but less so in others. If one contrives circumstances in which one has ample time but limited money, a certain game or a particular style of playing may be most appealing. Where money is available, but little time, another game or style of playing may offer the best prospects.

Many participants (n=18) recounted that their initial experience of EGM use was as a social activity in the traditional sense, that is a pastime shared with their partner, friend(s) or family. Some recalled regularly going to the pokies with a parent or family member when they were young. For a small number of participants (n=5), gambling continued to be perceived as a social experience after gambling had become established as a problem. For these people EGM use was reported as an activity deployed mainly to remedy boredom or loneliness. A female participant told us that "[i]t was social thing for me, to remedy boredom. I am a single female, so you can't go into a pub by yourself, but you can go to the pokies by yourself. Nobody cares at the pokies; people do not pay attention to you".

Overwhelmingly, participants' gambling moved to a stage where it was self-characterised as 'out of control' during or subsequent to their experience of a personal crisis or stressful

situation (n=10). Such situations or experiences included periods of ill-health (physical or mental), the death of a loved one, an enduring experience of boredom, arising for example from children having grown up and left home, or a partner who has taken to working excessively. Other factors reported included the loss of a job, or a relationship breakdown. Many participants talked about their first "big win" and how this had "sucked them in" initially (a "big win" was defined variously as ranging between hundreds to thousands of dollars). It was not uncommon for participants to report that when they started going to the pokies by themselves, they knew that EGM use was becoming a problem.

Participants reported that their sessions of gambling occurred across a range of circumstances. For some participants, gambling habits were regular. For others, gambling was generally quite impulsive, based on the availability of money and the presence of "the urge" to gamble.

Payday was often cited as a momentous, anticipated occasion for a number of participants (n=17). As one participant told us, "punters know exactly when their money's coming in". Some participants reported regularly "blowing" all of their money on gambling as soon as they got their pay. For those who worked, gambling on the way to work or before starting work (n=19), after work (n=15), during lunchbreaks (n=5) or in between work at different jobs (n=4) was usual, but was dependent on the availability of money. Some participants who were mothers told us that they would play EGMs while their children were at school. Some gambled at "every opportunity", or whenever they had the "urge" (n=6), noting that for many, "if you've got money, you've got the urge". Smaller numbers told us they gambled particularly when they had spare time, or felt bored (n=6).

4.4 Some observations on Dolphin Treasure and Indian Dreaming

In order to better contextualise the experiences of problem gamblers who participated in the research, we collected information about the most identifiable features and characteristics of two popular EGM games. These were Dolphin Treasure and Indian Dreaming, which were also identified in Section 2 as amongst the most consistently identified 'high performing' games operating in South Australia and in Section 3 as the two most popular machines amongst regular gambles.

Dolphin Treasure and Indian Dreaming are both products of Aristocrat, which at December 2005 supplied about 66% of the EGMs operated in South Australia. IGT supplied a further 19.9%, Konami about 7.9%, and the balance was supplied by another six gaming machine manufacturers (OLGC).

Dolphin Treasure and Indian Dreaming incorporate distinct strategies for inducing continuation of a gambling session – that is, extending 'time on device' (TOD), as was discussed above. If the object of gaming machine manufacturers is to maximise both time on device and revenue per available customer (REVPAC), these games offer examples of differing approaches to the solution of the resulting time and money equation (see sub-section 4.5).

The Aristocrat web site offers the following exposition of the distinction between these types of games:

> *Line games* are referred to as the more 'traditional' form of video reel games. These games utilise line formations on the reels to award wins to the player. This popular

range of games includes the highly successful *Queen of the Nile, King of the Nile* and *Dolphin Treasure.*
Aristocrat produces 3, 5, 9, 10, 15, 20 and 25 lines games and recently introduced the outstandingly successful *50 Lions* game where players can purchase up to 50 lines to play in one spin.
These games are extremely popular with players and Aristocrat is continually releasing new games for this category.

ReelPower™ games were another innovative game category introduced by Aristocrat. With this unique style of game, players purchase reels rather than lines. ReelPower™ opens up the power of scatter pays for all winning combinations in a five-reel video gaming machine.
In all markets where this patented concept has been introduced, the vast majority of players purchase all five ReelPower™ reels. An additional feature is the ability to multiply the winning prize by staking up to 10 times the cost of the reels purchased.
Since its introduction, the ReelPower™ concept has proven to be an outstanding success - both for operators and for players worldwide. (source: www.aristocrat.com.au/AUS/what/Games.asp)

With both games, as with most EGMs, the player is confronted with a complex and brightly coloured array above the screen where information about winning combinations is presented. In the case of Dolphin Treasure, this advises the player that: up to 15 free games may be won when the 'feature' is activated by the appearance of symbols; prizes won during the feature may be multiplied by three, four or five times depending on the number of symbols appearing; a Dolphin Sunset symbol substituting for another symbol will double the value of the prize thus won; bets may be made on up to 20 lines per spin; and that the maximum prize payout will be 90,000 credits. Gamblers told us they believe that the likelihood of obtaining the feature is increased by increasing the number of lines played, and we understand from field observations that this is the case. Gamblers also reported that they favour a maxi(lines)-mini(bets) strategy with some upwards flexibility on the bet value, which may be up to 10 credits per line. The credits won increases in proportion to the bet value, so that there are incentives to increase bet size if players 'feel' that a win is coming on, which is a commonly reported sensation. Gamblers also often report that by changing the bet value they will 'trick' the machine somehow into paying out.

The expectation created is that the feature provides something for nothing, as was discussed in the earlier part of this Section. It also provides the sense that one is covering all bases, even though this is an expensive form of insurance. A single button push on Dolphin Treasure of one cent credit value will cost 20 cents if all lines are being played and $2 if 10 credits per line are played. The average bet size for Dolphin Treasure in 2005-06 was in the range of $0.33 to $0.43 for one cent games, $0.47 to $0.64 for two cent games and $0.77 to $1.18 for five cent games (OLGC). Clearly, EGM gamblers using this game very frequently bet on multiple lines and at relatively high stakes, underlining the centrality of multi-line betting to EGM game performance. Dolphin Treasure is now a very standard old-style game in most jurisdictions, but on the basis of data analysed briefly in Section 2 of this report it appears to perform at or (increasingly) below par, as it were, and because of its ubiquity probably attracts those players who (as we were told) enjoy its familiarity. Players also report an attraction for the images on the screen, especially the Dolphins, whose fins some report 'scratching', as a lucky charm.

Indian Dreaming, however, operates in a different way. The ReelPower™ configuration, as noted in the above extract from the Aristocrat web site, means that the player selects 'ways of winning' rather than lines – up to a possible 243 'ways', which involves all possible combinations involving all five reels of the game. This selection costs 25 credits. The basic, default configuration is three 'ways', which bets on the central line (as do all combinations) plus all positions on reel one costs one credit. Nine 'ways' adds all combinations on reels one and two, and costs three credits. Twenty seven 'ways' adds all combination on reels one, two and three and costs seven credits. Eighty one 'ways' adds all combinations on reels one, two, three and four. Indian Dreaming also provides for multiplication of wins by up to 15 times if special symbols appear on reels two and four, and up to 20 free games may be won if a feature is activated.

Thus for the gambler seeking to maximise coverage Indian Dreaming requires considerable investment, with incentives built into the potential increased scale of rewards. One of the interesting paradoxes of EGM players is that many appear to be risk averse. Most report a dislike of the gamble feature (which allows for a straight double or nothing bet on the winnings of a spin) even though it is undoubtedly the most attractive bet on the game, and the only one where the odds of winning and the payout odds are actually aligned. A tendency towards risk aversion (of a sort) may be discerned in the tendency of some players – probably the majority interviewed for this research – to want to cover everything they can see, in case they miss out on a win appearing on a line they're not playing. Indian Dreaming caters to this, and if the Aristocrat statement above is to be believed, most players opt for the 243 'ways'. This has the appearance of a cost effective option, costing 'only' 25 credits per spin. Nonetheless, even on a one cent machine this equates to 25 cents per spin. The average bet for one cent Indian Dreaming games in 2005-06 was $0.50, suggesting that many players do in fact select the maximum 'ways' option and indeed do so on average whilst wagering two credits. For two cent games the average bet was $0.79 (OLGC). These averages underline the relative success of this game in contrast with the older but more ubiquitous Dolphin Treasure. These average bet data alone strongly support Aristocrat's claims for the success of the ReelPower™ technology.

Given the observations set out in this section, we are not surprised that Indian Dreaming 'over-performs'. It is an ideal game to extend time on device, and the price of covering all bases is set at a level which guarantees its attractiveness as an option and yet ensures a regular stream of reinforcement, boosted by the reported habit of serious gamblers to increase their bet level from time to time to 'encourage' the game to pay out, or to activate the free spin feature.

4.5 Conclusions

The process of researching EGM technology with problem gamblers confirmed the importance of the structural characteristics of gaming machines in structuring gamblers' gambling preferences. There was a very consistent strategy that emerged from the research process. This favoured strategy involved low credit bets but selection of multiple lines. The number of lines played seemed likely to push toward maximum lines routinely in many gambling sessions. The key variable routinely manipulated by problem gamblers was bet size, with a scaling up and down of bets occurring in anticipation of, or response to, machine events. Smaller numbers scaled bets to 'trigger' device events, as was the case amongst survey respondents of whom 14.4% said they increased bet sizes to trigger wins. There were

of course a variety of exceptions to this pattern, including those who bet more erratically and those who were disciplined in maintaining a low rate of expenditure (extending TOD). The economy of qualities of gaming machines that make up a single gaming room caters for all these gambling strategies and preferences.

Respondents also consistently preferred games where there were frequent wins, with the occurrence of wins seeming more important in problem gambler discourse than the size of those wins. Of course big wins were also valued, but featured most often in discussion in relation to the first big win the individual had experienced. The researchers formed the view that in this sample of problem gamblers there were a number who only became regular gamblers after their first big win. The preference for more frequent smaller wins would lead the researchers to conclude that those EGMs that pay out relatively large proportions of their RTP at the lower end of the prize scale would be heavily featured in the problem gamblers' favourite machines. As there were generally two main RTP settings (suggesting variation in pay-out tables, and perhaps in reinforcement schedules) operating for two of the most popular and relatively 'high performing' EGM games in the South Australian marketplace[14], there was also a likelihood that slight variations in the frequency of reinforcement might be felt by problem gamblers. This would be the case where gamblers 'tried out' various examples of their favourite machine within a gaming room or across a number of different venues. This might have the effect of altering playing strategies as gamblers sought the kind of balance between reinforcement and length of gambling session to which they had become accustomed, preferred, or felt they needed in order to be satisfied.

Although reinforcement and the thrill of winning was important in the testimony of respondents, particularly in relation to hearing other machines paying around them, the measure of value for money was very frequently the first and foremost consideration, obviously related directly to the time on device that the gamblers' stake would purchase. Therefore elements of particular games that might encourage higher levels of betting but reduce the amount of time on device could lead a particular gambler away from that game. The great versatility of the product mix in a particular venue is one of the strengths of the industry. The assembled EGMs in a gaming room are a textbook case of industrial variation, with variations between games including variations on the two dimensions of bet size and lines played that enable gamblers to regulate the rate of their losses to a desired level at least to some extent and for some part of the gambling session. This appears to allow the gambler to feel a sense of control and satisfaction, despite the net financial result being negative. Almost all our qualitative research participants reported that finalising a gambling session usually occurred because funds with which to gamble had been exhausted. Around one-third of the problem gambler segment of survey respondents confirmed this was the way their visits to gambling venues were finalised.

The basic operant conditioning effect that underpins the practice of EGM gambling consumption also appears to be the key component of the success of EGMs. This is also a risk factor leading to an 'unthinking' mode of EGM gambling consumption which becomes unsafe if excessively extended. Evidence for this risk factor emerged in researching with problem gamblers through descriptions of 'the zone'. The possibility of excessive gambling whilst 'in

[14] According to data provided by the OLGC, Dolphin Treasure games are deployed at RTP settings of 87.87% and 90.31%, and Indian Dreaming at RTP settings of 87.15% and 90.14%. All Shogun and Shogun 2 games appear to be operated at RTP of 92.75%.

the zone' is facilitated by the riskiness of current EGM market parameter settings, which allow rapid betting and large individual bets.

Based on this and previous research (AIPC 2006) the current researchers take the view that EGMs, despite being components of a very complex and elongated technical system, turn on the commodification of indeterminacy as mediated by probability. That is, EGMs apply probability principles via a commercial transaction to provide those who play them with the EGM experience, which for all the people interviewed for this project ultimately became a negative and destructive one. However the particular arrangement of options for exploiting probability is highly variable and nuanced by a host of features, including the symbols utilised on screen, the configuration of reels and pay-out tables, and the availability of particular events 'within' the game which may give the perception of achieving a special condition in the play cycle.

The hypothesis at the outset of this study was that certain technical features of EGMs undoubtedly exacerbate the tendency towards problematic or excessive EGM gambling consumption – essentially an operational as opposed to clinical definition of problem gambling. Problem EGM users are likely to prefer games that provide them with the most intense expression or extension of the EGM experience. EGM users are unlikely to undergo an entirely homogenous EGM experience, despite its underlying common structure, and this is itself reflected in the diversity of EGM games on offer. Industrial and experiential variation have a common root in human socio-symbolic capacities. However, many EGMs offer similar features and it is apparent that there are EGM games which are very much more popular (as measured by EGM performance) than others. It is also important to observe that EGM games pay out different proportions of their RTP at the lower, middle and top end of their prize table We hypothesise that this typology is reflected in the differential preferences of players, the precise structure of which may be more a matter of practical reason, that is embodied experience and habituation, than a conscious cognitive process. We sought data describing the following characteristics of selected EGM games during the course of this project:

- Distribution of prizes paid by pay table categories;
- Proportion of all wins occurring during the operation of 'free spin' features, and
- Average number of games between wins.

However, the OLGC advised that as it did not hold such data, it was not available to be provided to us. Such information is clearly critical to development of an understanding of the underlying 'attractiveness' or otherwise of EGM games and it seems to us highly desirable that future research into such matters (including research focused on risk identification and management and development of product safety guidelines for EGM games) should have access to such data.

The technical capacity to generate the huge number of theoretical outcomes available in EGM games relies on the use of some very 'long' virtual reels in each game, each with a large number of 'stops'. The variation in virtual reel lengths can play a role in the way symbols present themselves to the consumer. For example, one long virtual reel may hold only one winning symbol, reducing the chance of winning the major prize. Other shorter reels may carry several of the winning symbols increasing the frequency of the appearance of these desired symbols. Should a gambler decide to play multiple lines different virtual reels may be activated and the base algorithm may change, altering the pay-table. The repeated appearance

of the desired symbols associated with winning then creates a frequent 'near miss' effect. Habituation to this near miss effect is likely to entrench the operant conditioning effects associated with the random ratio schedules of EGM reinforcement, whilst ingraining in the gambler the need for comprehensive 'coverage' of possible game outcomes.

An analogy may be drawn here with scratch cards, highlighting the ambiguous nature of this process. It can be argued that if, on scratching the first five panels of a six panel 'scratchie', two maximum prize symbols (e.g. $100,000) are revealed then the consumer has a more 'exciting' and 'satisfying' experience for their $2 outlay than if they had only the opportunity to win a lesser prize ($5) when scratching the last panel. In fact this experience is also a function of the order in which the panels are revealed, for example, in that the random nature of scratchie play will produce different psychosomatic correlates ('adrenalin rush', or disappointment). The chance of winning does not vary from the moment of purchase to the final settlement of the transaction. However, the way in which the consumption is experienced varies considerably. The regular appearance of desired winning symbols on EGMs can arguably both enhance the consumption experience in terms of feeling 'close to a win' or 'in the game', and stimulate further play, which over time will inevitably extend losses. More generally, we were somewhat surprised by the number of respondents who advocated the 'close watching' of the virtual reels.

Respondents did not describe conscious decision making processes leading to decisions to use particular betting options in order to try and access certain prize categories or game features. This is a structural characteristic of EGMs that has in other research (AIPC 2006) been significant to a small number of gamblers. Very few respondents reported using the gamble option, and none said they gambled to the limit of five iterations following a single win. The net impact of the gamble feature may not be as important as it might otherwise be, if in fact problem gamblers (the highest spenders) usually avoid 'doubling up'. The underlying logic may be related to the fact that, according to at least one researcher, the gamble feature increases the overall volatility of the game (Toneguzzo1996). This could adversely impact on gamblers overall regulation of their losses over the course of a gambling session.

In terms of EGM game features that are an inducement for gamblers to gamble more, the clear favourite of the respondent group was free games. There were several elements to the popularity of free spins. First, free spins were seen as a double win because they were paid for by the game, the operator or the other player, with whom the gambler variously felt her or himself to be competing. This itself raises an interesting question about the status of 'paid for' wins – which may be in some sense little more than 'loss-wins' or 'loss delays' in that they are only part of the regulation of losses/extension of the session. Secondly, free wins were valued particularly on a number of popular EGMs in which the odds for wins during the free game features are tripled or more. Thirdly, pursuit of free games was the key identified enticement to gamblers to increase the scale of their bets. The strategy of raising the number of credits being bet was most often cited as being because free games were 'due', and thus an increase in bet size would maximise any returns, because of much increased odds (often tripled). Credit levels would be scaled back immediately if free games were achieved.

In summary, the findings of the qualitative research process offer strong support for aspects of the published literature on EGM structural characteristics. The operant conditioning effect emerges in discussions of persistence and repetition as respondents pursue wins and 'free' games. The manipulation of bet levels, usually on multiple or maximum lines, intersects with the chase for free games and other features. Winning prizes or features seemed to be

something that was experienced more for its own sake than for its actual size. Very few respondents articulated clear details about the size or details of specific wins - 'big' or 'small', simply to 'be-winning' was the articulated goal. More respondents mentioned the multiplied odds on offer in feature games than mentioned the dollar value of particular prizes they were seeking or had won. The play strategy favoured by the majority of respondents seemed to suggest that a combination of small bets on multi or max lines was the best way to 'be-winning' more frequently, but without reducing the duration of the gambling session to unsatisfactory levels.

5. Conclusions and discussion

5.1 Response to research questions

This section addresses in turn each of the questions contained in the terms of reference of this project. Questions relating to the review of existing research have been explicitly addressed in section 1.3 of the report and are not further addressed in this section. The Section then concludes with a more general discussion of issues revealed as pertinent to the relationship between EGM games and harm production, and the consequential issue of harm minimisation or reduction.

5.1.1 Research question one: "[do] particular gaming machine games feature more commonly in the play of problem gamblers as compared to recreational gamblers?"

Analysis of data pertaining to the performance and selected characteristics of the 'top 250' performing EGM games in South Australia in 2004-05 and 2005-06 revealed that the four most successful games in South Australia (by the number of specific games appearing in the 'top 250' games list) were Shogun, Shogun 2, Dolphin Treasure and Indian Dreaming. Of these games, Shogun, Shogun 2 and Indian Dreaming were all represented in greater proportion in the 'top 250' list than they are across the South Australian EGM market as a whole. Dolphin Treasure, on the other hand, constituted a smaller proportion of machines in the 'top 250' games compared to its proportion of all EGM games in the state.

Shogun 2 and Shogun machines in the 'Top 250' returned an average NGR of $263,501 and $221,857 respectively. Indian Dreaming and Dolphin Treasure games in the 'Top 250' averaged NGR of just under $200,000. The statewide average NGR was $59,618 for all EGM games.

The EGM reduction process between 2004-05 and 2005-06 saw Shogun 2 games significantly improve their overall proportion of the South Australian market, as well as their share of the 'top 250' segment. This was also true to a lesser extent for both Indian Dreaming and Shogun games. Dolphin Treasure games declined overall and in their share of the 'top 250' segment.

The analysis of available EGM performance data showed that four games appear to 'out-perform' the rest. A reasonable conclusion to reach from this is that some proportion of the performance of these machines is due to a disproportionate amount of problem gamblers' expenditure being directed to these machines. This is an indicator of which games problem gamblers use. It is not an indicator that these machines, in particular, are involved in the genesis of gambling problems, such that they would not have otherwise occurred had the individual gambled on different games.

The survey data collection for this project suggested that there are popular EGM games which appeal to both problem and non-problem gamblers. These include Indian Dreaming, Dolphin Treasure, Shogun and Shogun 2, Treasure Chest and Choy Sun Doa.

In the regular gambler survey, two gaming machines were disproportionately nominated by respondents in the problem gambler segment as their favourite game. The first was Indian Dreaming, which 19.6% of problem gamblers nominated as their favourite gaming machine compared to 9.7% of non-problem gamblers. The second such machine was Dolphin

Treasure, which 17.4% of respondents in the problem gambler segment nominated as their favourite machine compared to 9.0% of non-problem gamblers. There was a statistically significant difference between problem gamblers and non-problem gamblers in relation to the preference for Indian Dreaming as favourite gaming machine (Pearson's correlation coefficient $r = 0.131$, $p<0.05$).

Amongst problem gambler participants in the qualitative component of this project, Dolphin Treasure was clearly the most popular game. The ubiquity and apparent durability of Dolphin Treasure in the SA market appear to be important factors in this favouritism. Other popular machines were Indian Dreaming, Hearts, Black Rhino, Mermaids, Adonis and Shogun.

The triangulation of data sources in this project identify Indian Dreaming, Dolphin Treasure and Shogun (including Shogun 2) games as the key gaming machines in the South Australian market. The evidence of the qualitative data collection and the regular gambler survey suggest Indian Dreaming and Dolphin Treasure are disproportionately popular in the gambling of the problem gambler segment. The NGR data show these machines amongst the best performed in the market. Given the findings of the survey and qualitative research, and the fact that problem gamblers are known to contribute disproportionate amounts of NGR, then it is likely that Indian Dreaming, Dolphin Treasure and, in all likelihood, the Shogun games feature disproportionately in the gambling of problem gamblers, in terms of both time and money expended.

5.1.2 Research question two: "whether there are particular characteristics of those games that distinguish them from other games?"

As we discuss elsewhere in this report, it is unsurprising that all EGM users will find similar configurations and characteristics of EGM games attractive, given their design objectives of maximizing 'time on device' (TOD) and maximum revenue per available customer (REVPAC). Our estimation of such characteristics as theoretical utilisation rates suggests that the Indian Dreaming and Shogun games provide examples of the differing approaches utilised by EGM designers to achieve the design objectives. Indian Dreaming and Dolphin Treasure games appear to generate high NGR by achieving very high average rates of utilisation. Shogun games achieve high NGR by achieving a high average bet level. Indian Dreaming also appears to be successful at achieving a high average bet level relative to credit value.

Quantitative and qualitative data collected for this project suggest that the very common free spin feature of EGM games is also very attractive to gamblers. Free spins appear to the most important secondary reinforcement technique. Free spins and other game features are significant in achieving relatively high average bet sizes, particularly in combination with the multi-line (or in the case of Indian Dreaming, the ReelPower™) betting arrangements which permit EGM users to cover all possible winning combinations. Both qualitative and quantitative data support this conclusion. Thus, the combination of bet sizes which are large multiples of the credit value, and a high rate of utilisation, permit low credit value games such as Indian Dreaming and Dolphin Treasure to generate high average NGR.

The important core technology which we have been unable to investigate for this project is the reinforcement schedule of the various EGM games of interest. This is at the very heart of EGM technology, and is almost certainly central to the success or otherwise of particular EGM games. However, we were advised by OLGC that key data which would have enabled

modelling of the differences in the operation of reinforcement schedules of particular machines were not held by the OLGC and thus were not available.

The success of the four games identified as the best performed in the SA market is largely due to their incorporation of the fundamental EGM characteristics, particularly random forms of reinforcement, designed to extend TOD and REVPAC. It is difficult to isolate particular characteristics of individual games as distinguishing them from other product offerings in the market. This is particularly the case given issues of market share, marketing, location and density, etc., some of which are covered in some detail in Section 2 of this Report.

Although it is difficult to isolate characteristics that distinguish high performing games from other games in the market, it is more possible to distinguish amongst those high performing games for which additional data were available due to this market leadership. The differences between these games in terms of average bets and utilisation rates are described in detail elsewhere in this report. However, one structural characteristic, a different configuration of multiple-line betting, separates Indian Dreaming from the other high performance games analysed. The ReelPower™ feature that separates Indian Dreaming from other high performing games allows gamblers to bet on reels, lines and combinations of the two. ReelPower™ games (the name and innovation are proprietary technology of Aristocratic Technologies) offer a greater multiple of lines that are available for gamblers to gamble.

As with other high-performing games, Indian Dreaming games in the 'top 250' returned NGR well above market average performance. In this 'top 250' cluster, Indian Dreaming also achieved much higher average bets than the popular Dolphin Treasure machine at the same credit value settings. One-cent credit Indian Dreaming games have an average bet of $0.50 compared to one-cent Dolphin Treasures games that have an average bet of between $0.33 and $0.43 (depending on their setup configuration). This equates to a difference between these two games of from 14% and up to 34% in average bet size. As the survey and qualitative data showed, multiple line betting is associated with larger bets, particularly to cover more winning options and to counter the 'near miss' effect. The higher average bet returned by Indian Dreaming in comparison to Dolphin Treasure is thus very likely due to the greater number of lines that can be gambled. EGM gamblers appear to prefer to 'cover all bases', and Indian Dreaming offers the opportunity to do so, at what appears to be a high average bet level.

The very high average bet sizes on Shogun and Shogun 2 are due to the higher credit value of these games in comparison to other high-performing games. Although the average bet size is a much lower multiple of the minimum bet than is the case with the other high-performing games analysed, the size of the credit value determines that higher stakes are wagered on these games on average. To the extent that higher stakes induce gamblers to lose more quickly and spend more money than intended this constitutes a risk factor for excessive gambling.

The data analysis shows that much greater stakes are required to gamble on Shogun than other high-performing machines for the same period of time (see Table 5.1). Survey data showed that regular gamblers lose disproportionately large amounts of money gambling on high stakes machines relative to the allocation of time to low, medium and high stakes gaming machines (see Appendix F). Our analysis showed that Shogun and Shogun 2 achieve this disproportionately high NGR despite lower utilisation rates, which distinguishes these games from other high-performing games.

5.1.3 Research question three: "whether those differences are the characteristics that attract problem gamblers and feature in problem gambling play?"

Indian Dreaming was the gaming machine most strongly linked to the problem gambler segment amongst survey respondents and was popular amongst problem gambler participants in the qualitative research.

The ReelPower™ technology featured in Indian Dreaming differentiates the Indian Dreaming game from other high performing games. The higher average bet returned by Indian Dreaming, when compared to another well-performed game of the same credit value, is very likely to be linked to the additional multiple betting options that the ReelPower™ feature provides. The extent to which the additional number of lines available to gamble on ReelPower™ is correlated to higher average bet levels thus constitutes a risk factor for excessive gambling and for transition to problem gambling. To the extent that problem gamblers utilise Indian Dreaming, then the apparent tendency of ReelPower™ technology to drive average bet size up constitutes a risk of exacerbating problem gambling behaviour.

The high credit value ($1) of Shogun and Shogun 2 games means that the minimum bet on these devices is higher than the average bet on other high performing games such as Indian Dreaming and Dolphin Treasure. This is already something of a risk factor for excessive gambling given the large stakes required to play these games for a comparable length of time to other games.

Using survey data and average bet sizes, we calculated that about two-thirds of the losses incurred by respondents in the problem gambler segment are accounted for by their use of one-cent credit value games. Gambling on one-cent credit value constitute nearly 90% of the average amount of time the problem gambler segment spent gambling on gaming machines. In contrast, we estimate that around 20% of problem gambler expenditure is attributable to just 4.7% of aggregate game time devoted to the use of one dollar credit value games. Gambling on one-dollar credit value EGMs such as Shogun and Shogun 2 accounts for a disproportionate amount of problem gambler losses relative to time spent on different credit value machines. This constitutes a risk that problem gambling will be exacerbated by more rapid and/or larger losses.

On a session by session basis, calculations suggest that problem gamblers average losses of around $70, nearly twice the average per session losses of non-problem gamblers (see Appendix F). Given that problem gamblers also report many more sessions per week than non-problem gamblers on average, problem gambler losses (and associated harm) will be considerably higher than those of non-problem gamblers. Problem gambler patterns of play and expenditure mean that very large amounts can be lost very quickly, particularly when playing games where average wagers are in excess of $3 per button push. Table 2.9 highlighted the fact that multiple line betting is the standard practice amongst gamblers and that credit values are not useful indicators of bet sizes. Whilst much higher average bets are made on high credit value EGMs, low-credit value machines are very successful in terms of inducing consumers to, on average, spend very large multiples of the allowable minimum (Table 2.9). Calculations of the average amount staked per minute and NGR per minute on popular EGMs are shown in Table 5.1.

Table 5.1 Popular games, calculations of stakes risked and NGR per minute

Game name	Credit value	Average bet size ($)	Theoretical average stake per minute ($)		Theoretical RTP (%)	Theoretical average NGR per minute ($)	
			6 spins per minute	*12 spins per minute*		*6 spins per minute*	*12 spins per minute*
Shogun	$1	3.01	18.06	36.12	92.75	1.31	2.62
Shogun 2	$1	3.04	18.24	36.48	92.75	1.32	2.64
Indian Dreaming	$0.01	0.50	3.00	6.00	89.80	0.31	0.62
Indian Dreaming	$0.02	0.79	4.74	9.48	89.54	0.50	1.00
Dolphin Treasure	$0.01	0.33-0.43	1.98-2.58	3.96-5.16	87.87	0.17-0.31	0.34-0.62
Dolphin Treasure	$0.02	0.47-0.64	2.82-3.84	5.64-7.68	87.87	0.34-0.47	0.68-0.94
Dolphin Treasure	$0.05	0.77-1.18	4.62-7.08	9.24-14.16	89.23	0.50-0.76	1.00-1.52

Source: OLGC, calculations by authors.

Utilising actual average bet figures, the calculations shown in Table 5.1 show that on average significant stakes are required to continue EGM gambling, even using one-cent credit value machines and betting at a relatively leisurely rate. To gamble continuously on a one-cent credit value Indian Dreaming machine the required amount staked per hour is approximately $180, when making average size bets at the relatively slow rate of six per minute, or $360 if average spin rate is 12 per minute (i.e., a wager every five seconds). Theoretical average NGR per hour on this game would be $18.60 at a spin rate of six per minute (i.e., one spin every 10 seconds), or $37.20 at the more likely average spin rate of 12 per minute. Gambling on one-dollar credit value machines is somewhat more expensive. Making average bets on Shogun at the quite slow rate of 6 spins per minute would require staking (cash plus credits won) to the value of $1,083 per hour, which would, again, be doubled if the spin rate were increased to one bet every five seconds. Theoretically, average net gaming revenue for this hour would be $78.60 (or $157.20 if betting at five second intervals), although it must be strongly emphasised that the likelihood of any individual achieving this relatively modest expenditure outcome is extremely low. The very high volatility of outcomes when considered at the level of an individual gambling session means that actual session outcomes will vary widely around these calculations, based as they are on aggregate average gambling indicators. In practice, the pattern of distribution of the games' payout tables will tend to skew the actual outcomes per session of gambling in the direction of much higher NGR per session, since a very small proportion of actual payouts will be relatively large. The information required to calculate the actual proportion of such payouts and their contribution to total NGR were not available to us for this study, the OLGC having advised us that it does not hold such data. Accordingly we were unable to utilise such information to modify the above calculations (or those set out in Appendix F) to render them more representative of typical gambling sessions. Nonetheless, we do know that problem gamblers interviewed for this study overwhelmingly report that their gambling sessions come to an end at the point of the exhaustion of all available funds. What these calculations do show, however, is that, even using average bet sizes, the scope exists for rapid and substantial losses. Those who stake above the average, who are most likely to be problem gamblers, can accumulate far more substantial losses. If problem gamblers are more likely to gamble relatively rapidly in terms of spins per minute than non-problem gamblers, as some literature suggests, the risk of excessive gambling is further heightened.

5.1.4 Research question four: "to what extent [do] those characteristics affect the play of recreational gamblers?"

The qualities of EGM technology that attract problem gamblers to spend the amounts of time and money on EGM gambling that they do are also present in the interaction between non-problem gamblers and EGMs. The primary reinforcers of frequent and large wins and free game features are the most popular characteristics with both problem and non-problem gambling segments.

The problem gambler segment of the regular gambler survey averaged losses on gaming machines of rather more than $70 per visit to a gaming venue. This was double the average per visit loss of the non-problem gambler segment (see Appendix F). Given that problem gamblers also gamble more frequently than non-problem gamblers on average, problem gambler losses (and associated harm) will be many times higher than those of non-problem gamblers.

The staking of larger bets and the coverage of additional numbers of lines are the key techniques by which larger amounts are spent to retain parity of TOD. A key measure of a satisfactory gambling session according to the problem gambler participants in qualitative data collection is an 'acceptable' duration for the money spent. Increasing the cost of the achievement of an acceptable TOD is the key to higher REVPAC and hence increased NGR. This basic equation is likely to apply equally to non-problem gamblers who also prefer to receive acceptable value for money, in the form of both reinforcement and entertainment.

The distinctions between problem and non-problem gamblers we have identified in relation to player behaviour appear to be centred on the amount of time devoted to and the amounts expended during sessions of EGM use. Qualitative data also suggest that many problem EGM users also experience the escapism of 'the zone'. Many of the gamblers we spoke to for the qualitative data collection undertaken for this project described how their gambling 'careers' usually commenced within a more or less enjoyable social context, before progressing to a stage where gambling was undertaken alone, and with increasing frequency and preoccupation.

The characteristics that enable problem gamblers to spend much time and money on EGM gambling are also present in the interaction between non-problem gamblers and EGMs. The calculations included in Appendix F also demonstrate that non-problem gamblers spend as much as a quarter of their aggregate losses on one-dollar credit value EGMs, higher than the proportional amount lost by problem gamblers, even though the actual amounts lost are much less. This demonstrates that it is very easy to lose large sums of money relatively quickly on high credit value EGMs. When it is considered that problem gamblers spend longer periods of time gambling on EGMs and do so on more occasions per week, it becomes clear that high credit value EGMs are a site of heightened risk of excessive gambling for problem gamblers. At the same time these high credit value machines are not the most popular machines amongst non-problem gamblers and their absence would be unlikely to have a significant impact on their enjoyment of EGM gambling overall. A larger proportion of non-problem gambling time is spent playing either one cent and one dollar credit value games than is the case with problem gamblers, who are much more likely to utilise two and five cent credit value EGMs than non-problem gamblers. Non-problem gamblers would therefore have significant scope to expand their time gambling on two- five- and ten-cent credit value machines if one-dollar

machines were to be removed to reduce the risk of excessive gambling by the problem gambler segment.

5.1.5 Research question five: "to what extent do those characteristics feature in a gamblers' transition from recreational to problem gambler?"

It is a truism that all problem gamblers were at one point, however briefly, social gamblers. This may not be an entirely universal experience – some gamblers report that they began to gamble harmfully from their first experience of EGM gambling. However, those cases are exceptional. It is clear that some EGM games are more successful than others, which means they generate more player losses (NGR) than other machines, and appear to do so consistently. It is inconceivable that those machines generate such consistently high NGR without attracting a disproportionate contribution from problem gamblers, who as we have demonstrated in the body of this report are likely to be responsible for at least a third and as much as half of the value of all EGM consumption. However, it is equally inconceivable that high NGR can be achieved without steady contributions from non-problem gamblers. Indeed, the data we have collected for this study demonstrate that the same games feature as favourites amongst both problem and non-problem gamblers alike. Thus, there is a strong case to suggest that successful EGM games deploy features which are attractive to both problem and non-problem gamblers alike. In the course of a gambling career it is probable that gamblers will try many games and may settle on some favoured game. Certainly the qualitative data we collected suggest that this is the case for many problem gamblers.

The qualitative data collected suggests a range of pathways to problem gambling, many associated with the need to find solace, meaning or escape from one or other of life's vicissitudes. It is as though the highest performing EGM games offer a potential for such an 'escape', which once established can be accessed readily.

The prevalence of problem gambling is relatively high amongst those who gamble most regularly (as reinforced by the prevalence of problem gamblers in our regular gambler survey), so key parameters distinguishing transition to problem gambling are likely to be increased frequency of gambling activity, and extended length of individual gambling sessions.

The same EGM structural characteristics are at work on all gambler segments, designed to extend TOD and REVPAC. This may induce periodic harm via higher than anticipated losses for those in the non-problem gambler or low-risk gambler segments on occasions. However, it is likely that repetitive exposure to structural characteristics which re-configure consumption behaviour and increase the rate and/or magnitude of losses is the foundation of transition to problem gambling.

Three key structural characteristics were identified in the research as increasing the risk associated with gamblers' consumption of EGM gambling:

- High credit value games produce high average bet levels. Minimum bets on high credit value games are larger than actual average bets on low credit value games and small multiples of the minimum bet on high credit value machines lead to very large bets (examples are Shogun and Shogun 2);
- Multiple or maximum line betting on small credit value games leads to increased average bet sizes, with large multiples of small minimum bets leading to actual

average bet sizes of between 20 and 50 times the minimum bet (example is Dolphin Treasure); and

- Reel betting extends the options of line betting on small credit value machines, leading to increased actual average bet sizes in excess of those achieved on comparable credit value machines that only allow line betting (example is Indian Dreaming incorporating ReelPower™ technology).

The structural characteristics identified in the research operate as inducements to increase stake and coverage. As the literature and the research data compiled for this project show, a range of factors including 'insuring' against apparent near misses, anticipating free spin features and taking up opportunities to gamble reels as well as lines operate to push average bet sizes higher. These characteristics are the basic elements of growth in both time on device (TOD) and revenue per available customer (REVPAC).

In terms of gamblers' transitions from non-problem or low-risk to moderate and high risk segments of the gambler population these factors constitute a decisive risk of excessive gambling. The three factors identified constitute a risk of excessive gambling as they institute a tendency to 'raise, increase and expand' as normal practice in the experience of EGM gambling consumption. The games analysed perform as they do in terms of NGR due to the taking up of options to bet multiples of the minimum bet, multiple or maximum lines, and in many cases both, as the survey of regular gamblers data shows. The data assembled here has highlighted that increased gambling options and high credit value games are correlated to higher average bets. The stakes required to gamble for a defined period of time (TOD) increase as average bet size rises.

Gambling-related harm largely derives from expenditure of excessive amounts of money and time. EGMs are designed to assist this to occur, some more successfully than others. EGMs which generate high average bet levels, particularly high average bet levels proportional to credit value, provide a capacity for losses and harm to escalate rapidly. The opportunity for open-ended or excessive gambling is thus the fundamental configuration of EGM gambling consumption, built into the design and structural characteristics of EGM technology. As the literature shows, the experiential dimension of gambling includes many forms of excessive gambling – going on a bender or spurge; losing control; chasing losses; becoming obsessive; getting into 'the zone'; dissociating from life stresses; etc – all of which typically result in individual gamblers suffering harm. The transition to harmful problem gambling is the habitual or repetitive replication of these kinds of gambling experience. Unfortunately the configuring of EGM technology to achieve extended TOD and increased REVPAC means that this transition all too often results in harm production.

The potential production of harm in contemporary commercial EGM gambling markets is virtually unlimited due to 'high' parameter value settings within the governing system, and to structural characteristics, both of which facilitate an experience well in excess of that required to satisfy 'consumer demand' for cheap and safe amusement. The production of harm is manifested in the toll on gamblers who transition from non-problem gambler status to high risk segments. This process takes time, but the capacity for harm pre-exists, embedded in the tendency of EGM technology to push toward extended gambling sessions and increased expenditures and the setting of parameter values at levels that actively pursue excess. The structural characteristics highlighted in this report thus undoubtedly contribute to the risk that this transition will be made. The production of harm represents the exploitation of those

gamblers who lack the necessary personal, financial or social resources to avoid the transition from non-problem or low-risk gambling to problem gambling. The number of problem gambler participants in this project whose current counselling or treatment relationship was not their first confirms an unhappy fact, that once the transition to problem gambling is made it is frequently very difficult for individuals to backtrack.

5.2 General observation arising from the research

If the maximum bet on EGMs was one dollar and the maximum available line configuration was nine lines, one could play a one-cent EGM using the mini-max betting style at nine cents per spin, which would in all probability reduce the average bet size from around $0.33 or $0.50 to perhaps half those amounts, or less. Shogun and other one dollar credit value games would be limited to one line per play. This may have the effect of extending the amount of time people would play EGMs, but such a move would almost certainly have little impact on the enjoyment of non-problem gamblers, with the possible exception of those who want to gamble relatively large amounts and may be most at risk of developing gambling problems. At the same time such a configuration would be very likely to reduce losses and the absolute harm produced via EGM gambling. The number of regular EGM users who become problem gamblers would be highly likely to decline, as would the members of family, friends, employers and other affected people, who suffer negative experiences due to problem gambling. Reducing the extent of excessive gambling through material change will almost certainly bring about changes in behaviour and reduce the level of harm produced. Material change is a key precursor to behavioural change, rather than a consequence, a conclusion which we believe to be strongly supported by the data we have analysed in this report.

As we have observed throughout this concluding section, and elsewhere in this report, the core technology of EGM games is the reinforcement schedule. Although in part exploratory, this project has produced some important findings in relation to aspects of EGM performance, including the identification of the most 'strongly' performing EGM games in South Australia, aspects of their configuration, and the behaviour and beliefs of problem and non-problem gamblers. However, unless independent researchers are able to gain access to details of the pay tables and other aspects of reinforcement schedules, the observations we are able to take are largely artefactual – that is, the observation of effects rather than the determination of causes. This is no novelty in social research, but given that such data exist and are well understood by one side of the gambling industry (manufacturers and, perhaps to a lesser extent, operators) they should also be understood and acted upon by the other side of the equation –researchers and, more importantly, regulators. In a general sense, the capacity of the general public to give informed consent to the continuation of the regime of EGM regulation may also be dependent on a much more accurate understanding of the actual operating principles of EGM games. In the absence of information about and systematic analysis of pay tables and related core aspects of EGM games, and their effect on game outcomes and player behaviour, it is hard to suggest that regulators and thus the public are in any position to know what EGM gamblers are actually buying.

Whether access to such data, information and associated analysis becomes possible or not, however, we believe that there is ample scope arising from this project to undertake risk assessment and risk management activities with a focus on high performing EGM games. Such activities could utilise a methodology similar to that utilised in this report to identify high performing games, and to then subject a good sample of those games to careful scrutiny to identify patterns of play and the extent to which those patterns demonstrate the likelihood

of problem gambling being concentrated or over-represented via use of the machine. It may be that the Shogun, Shogun 2 and Indian Dreaming Games could form the first group of games to undergo such an examination, given their clear prominence in the South Australian market. We understand that recent work by Schellinck and Schrans in Canada (Focal Research 2007) demonstrates that it is feasible to develop observational tools which permit assessment of the likelihood that particular patterns of play reflect problem gambling. This is obviously easier to achieve where demand side data are systematically collected (e.g., via a loyalty card system) but we could envisage utilising a combination of supply side data and patron interviews to develop a useful database.

The results of such research, including analysis of EGM game reinforcement schedules in the context of comparative game performance, could be used to strengthen South Australia's existing harm exacerbation guidelines. These guidelines, in company with what constitutes a major harm minimisation measure in the prohibition on Bank Note Acceptors (BNAs), are likely to have restrained the growth of gambling expenditure in the state. Given the proliferation of EGMs in the state's hotels and the relatively high level of EGM density, the level of per capita EGM consumption is comparatively modest. The degree of restraint placed on the selling of new game innovations into the marketplace probably means growth in EGM-related losses and net harm has been slower than it would otherwise have been. The problem, of course, is that this could only be evaluated if the level of expenditure and harm production that would have occurred without the Guidelines was known.

Restraining the flow-on of innovations in games and technology may or may not continue to be a viable option into the future. Whilst a non-exacerbation approach may be useful as a holding pattern, it may be necessary to reconsider the longer term strategy. In particular, guidelines which require best practice product safety innovation could be introduced and periodically updated. Such an approach would create a more dynamic market for new machines, to the benefit of manufacturers, and would integrate the goal of reducing the level of harm produced through the consumption of EGM gambling. On the other hand, innovations that create pre-conditions for player harm would be disallowed.

At the outset of this project it appeared likely that some EGM games were more likely than others to be associated with problem gambling behaviour. On the basis of the evidence collected during the project, this appears to be the case. However, it should not be assumed that this is due to the innate properties of these popular machines, that these machines are somehow different to alternative devices, or that if these particular machines were removed then other machines would not assume the status of 'most popular' or 'highest performing' devices, and similarly be disproportionately associated with the production of harm. On the balance of the evidence compiled here, it is nevertheless highly likely that the machines that are the most successful in the market are also disproportionately benefiting from the time and money expended by problem gamblers. The EGM games that have been identified as performing at well above average levels are therefore also likely to be generating disproportionate amounts of problem gambling-related harm. As the most popular machines they are also likely to provide the most common pathway for the transition from non-problem to problem gambler. As such, they warrant closer scrutiny along the lines suggested above, and in particular require analysis of the relationship between reinforcement schedules and player behaviour, with a view to modification in the interests of consumer safety.

Appendix A

Details of sites for focus groups and interviews

Group 1 = Anglicare (Salisbury) (x4)
Individual = Anglicare (Salisbury) (x1)
Individual = Relationships Australia (Adelaide) (x6)
Individual = Centacare (Port Lincoln) (x3)
Group 2 = Anglicare (Salisbury) (x5)
Group 3 = Uniting Care Wesley (Port Pirie) (x9)
Group 4 = Salvation Army (Kilkenny) (x2)
Group 5 = Relationships Australia (Hindmarsh) (x3)
Group 6 = Salvation Army (Kilkenny) (x5)
Group 7 = Lifeline (Mt Gambier) (x5)
Individual = Lifeline (Mt Gambier) (2)
Individual = Flinders University (x1)
Group 8 = Flinders University (x8)
Group 9 = Flinders University (x9)
Individual = Telephone interview from Melbourne (x1)

Total = 64

Appendix B Schedules to guide focus group and individual discussions

Basic information:

1. Gender Male Female

2. Age

3. Occupation

4. Country of birth

5. Number of years you have used EGMs

6. Has EGM gambling been a problem for you?

    a. If so, number of years that EGM use has been or was a problem

During the time of maximum EGM use, please estimate:

7. Average amount you would spend per EGM session

8. Average time you would spend in each EGM session

9. Average number of EGM sessions per week

10. Do you gamble in any way other than EGMs?

    11. If so, what other forms of gambling do you use?

    12. Is this/are these a problem for you?

Discussion schedule – EGM gamblers

We are interested in your views on the importance of EGM features or characteristics, or types of games, to the 'attractiveness' of EGMs. In particular, we are interested in whether you believe that there are aspects of EGM games that may have influenced your decisions about playing EGMs. Although we have a set of questions we would like to ask, we are more interested in having a conversation with you about these aspects of EGMs, so please feel free to add anything else you think is relevant.

Before we start we would also like you to fill in a brief information sheet so we have an understanding of the background and experience of the people we speak to.

We must also ask you to complete a consent form, after you have had a chance to read an information statement about the research. However, you are not required to use your real name for this and we will not collect any information which would enable you to be identified by any person. We will ensure that no-one has any access to information which could identify you in any way.

Once you have completed the consent form we will provide you with remuneration for your time in the form of a gift voucher to a department store. We should also let you know that we will tape record the sessions. However, you will not be identified on this recording, and we will not use it for any purpose other than verification of the discussion.

We'd like to start by asking a few questions, but please feel free to add anything you feel is important to the discussion.

Questions over page:

1. **First of all, can you tell us about the kinds of EGM gambling venues you prefer?**

Prompt for: Venue type (hotel, club, casino)
Venue size
Anonymity or recognition – friendly environment (staff/gamblers)
Location – local, work context, etc.
Number of venues regularly visited

2. **Can you tell us about the circumstances in which you tend to visit EGM gambling venues?**

Prompt for: Everyday context of gambling practice (e.g. after work, Fri night, dropping off kids, etc.)

Explore: Life course events arising from how start gambling or why like to visit (e.g. 'I started gambling when I got my disability payout and left work', 'the kids had left the nest' etc.)

3. What do you like about EGM gambling?

Explore: Pleasure (attraction) v. escape

4. Do you have a favourite machine or machines you prefer to play?

Probe: Names of machines
Attractiveness of features – Why do you like [Machine NAME]?

Some possible prompts:

i. Music or tones;
ii. Artwork or theme
iii. Name of the game
iv. 'Characters' or symbols in the game
v. Free spin features - games
vi. Jackpot
vii. Moving to next stage or phase of the game
viii. Substitutes
ix. New games or upgrades
x. Doubles/triples
xi. Other (please specify)

5. What credit value/denomination machines do you usually prefer to play? What strategy do you use – number of lines and bet size?

Probe: Strategies used to try and win (e.g. betting up or down, etc)
Beliefs about EGM operations – gamblers fallacy, law of averages etc.

6. Can you describe the experience of gambling on your favourite machine?

Explore: The Zone

Prompt: What's it like when you're really into it/are in this state of mind?

Social or asocial
Bodily and mental sensations
Time
Boundaries – what intrudes on zone – external or internal limits?

7. What normally brings your EGM gambling session to an end?

Explore: Finalisation – boundaries, time, money
Extending sessions – ATMs, loans, etc

8. How would you compare your early experiences of EGM gambling with your later ones?

Explore: Gambling career
Emotions
Relationships
Life-course changes and links

9. What strategies have you used to try and change your gambling behaviour?

Prompt & Explore: Budgets – limited funds into venues
Limits on bank accounts or other such measures
Help from friends, family, partners
Changing routines – e.g. driving different routes etc.

10. Are there any other things you think we should know about EGMs, or other comments you would like to make?

Thankyou for participating in this interview.

Appendix C Literature review and references

Introduction

This literature review provides an overview of material relating to the relationship between problematic gambling behaviours and the characteristics and features of electronic gaming machines (EGMs) and games installed on EGMs. The review also provides an overview of the relevant areas where published research appears to be in broad agreement, where there are gaps and/or disagreements in research knowledge, and lists some priority areas for focusing the research phase of this project.

The broader purpose of this review is to identify themes and assess the current level of understanding of the relationship between EGM games, EGMs and problematic gambling behaviour in order to inform the primary research activity of the current project, which will involve analysis of quantitative data and information arising from discussions with gamblers. It should also be noted that the regulatory, geographic and venue environment in South Australia is distinct both from other Australian jurisdictions and certainly from other jurisdictions overseas, and that therefore some information contained in this review may have limited relevance to the South Australian situation. Nonetheless, information set out in this review will assist in informing the further work of the project and is also intended to assist in development of issues for discussion with stakeholders engaged in this field, both in South Australia and more broadly.

Gaming Machines & Problem Gambling

It is widely held that gaming machines are more likely to lead to problem gambling than other forms of gambling (PC 1999: Ch. 8; SACES 2003: 11-14.) The disproportionate amount of EGM expenditure calculated to derive from consumption by problem gamblers was estimated as 42.3 per cent by the Productivity Commission (PC 1999: 7.46).[15] It has been argued that the particular qualities of gaming machines accentuate the potential for excessive gambling and that "more attention needs to go to understanding how their design and working play on human psychology to control and seduce" (New Focus 2003: 42). It has also been argued that machine gamblers who develop gambling problems do so much quicker than those 'traditional' gamblers who develop problems (Breen 2003: 31). It has also been suggested that intra-personal variables such as gender and the presence of co-morbid disorders do not generally affect the speed with which people develop gambling problems, but rather that the "social, environmental and stimulus features of mechanised gambling are implicated" (Breen 2003: 31). However, some studies have cited some interaction between internal determinants, such as negative affect (Rodda, Brown & Phillips, 2004), and maintenance of gambling behaviour, noting high rates of smoking amongst people who also score high on problem gambling scales.

Research into gaming machines and problem gambling is wide-ranging and fraught with complexities relating to the differences in types of machine gambling, problem gambling prevalence rates, and the varying social, cultural, economic and political contexts within which both machine gaming and research take place. As discussed above, gaming machines,

[15] Proportions of gambling expenditure contributed by problem gamblers for other gambling forms: wagering 33.1%; scratchies 19.1%; casino table games 10.7%; lotteries 5.7%. Adjusted total for all: 33.0% (PC 1999: 7.46).

and their operational and regulatory systems vary widely across jurisdictions. However, research tends to take it as a given that gaming machines are relatively generic in their key features, even in circumstances where the readership audience can be assumed to be international. This may influence research results substantially (see, for example, Lepper and Creigh-Tyte 2005).

Emerging predominantly from the discipline of psychology, recent research has focused on behaviourist/learning, cognitive and need-state theories. These have been argued to have a special application to EGM gambling (even while the current trend in policy and practice could be argued to be toward more broadly encompassing psycho-social explanations for excessive or problematic gambling).

Recent approaches to the study of problem gambling

There is a growing international literature on gambling in general and problem gambling in particular. In this paper we refer to selected recent approaches to the question of problem gambling that can be described as somewhat multi-dimensional in character. These approaches advocate research into problem gambling that integrates both a range of theoretical perspectives and variety of levels of analysis (social, cultural, local and personal).

In an article advocating a 'biopsychosocial' approach to the study of gambling behaviour, Griffiths (2001) describes the strengths and weaknesses of various analytical approaches and documents some useful findings about problem gambling aetiology to date. He concludes by recommending a constructive and integrative utilisation of existing theory and knowledge about problem gambling.

> Gambling is…a complex, multidimensional activity that is unlikely to be explained by any single theory. Instead, this research is best served by a biopsychosocial model that stresses the individual and idiosyncratic nature of the development of gambling problems and emphasises the role of contextual factors internal and external to the process of gambling itself (2001: online version, no pagination).

Griffiths argues that theories may be complementary rather than mutually exclusive and that limitations of individual studies might be overcome through the combination of ideas from different perspectives (2001). Though sociological theories are invariably overlooked by experimental psychologists examining the issue of problem gambling (at least in the English-speaking world), Griffiths is of the view that sociological theories also appear to be critical in understanding the acquisition of gambling behaviour.

Griffith also makes the point that there is no clear-cut distinction between problem gambling and normal gambling, "rather there is a continuum from social gambling to 'regular' gambling to problem gambling" (2001). This has fundamental implications for both theory and research methodology – in particular, many experimental studies are based on the idea that there are two separate groups 'problem or pathological gamblers' and non-problem gamblers.

Blaszczynski (2000) has developed a useful theoretical model describing various pathways that people might take toward the acquisition of gambling problems. This research is based on experience with a clinical population (where people are seeking help or are compelled to seek help) and, as such, particular social groups are likely to be more predominant in the research

sample as compared to the broader population. According to Blaszczynski (2000), all treatment models assume that gamblers are a homogenous population and that theoretically derived treatments can be effectively applied equally to all problem gamblers. Instead, he proposes that problem gamblers form a heterogeneous population, which varies in significant ways - the end result of a complex interaction of genetic, biological, psychological and environmental factors. Hence, he describes a differentiated model that identifies three main subgroups.

> *1. Normal*. These gamblers lose transient control over their behaviour because of irrational cognitions and thought patterns, which lead to a series of poor judgments. Following this, they become temporarily over-involved in gambling. These gamblers 'require minimal interventions, counselling and support strategies and may resume controlled gambling post intervention. Self-help groups such as Gamblers Anonymous are effective, as are self-control, self-help educational materials.'
>
> *2. Emotionally vulnerable*. These are gamblers who participate for emotional reasons – to dissociate ('cut off') as a means of escaping painful life stresses, to reduce boredom, or to deal with unresolved psychological conflicts or childhood traumas. They require more extensive therapeutic interventions, which might include the development of stress management and problem solving skill or therapies aimed at resolving psychological conflicts and improving self-esteem.
>
> *3. Biologically based impulsive pathological gamblers.* This subgroup is defined by the presence of neurological or neurochemical dysfunction. These gamblers suffer a medical and/or psychiatric condition that is characterised by impulsivity and features of 'attention deficit disorder'. For members of this group clinicians must attend to problems related to attention and organisational deficits, stress intolerance and poor problem solving and coping skills. These gamblers may require intensive cognitive behavioural interventions aimed at impulse control over longer periods of time. Medications for reducing impulsivity may be considered.

Furthermore, it is proposed that there are three elements relevant to all gamblers regardless of subgroup membership (Blaszczynski 2000).

Conditioning/reinforcement through 'rewards' from gambling. Various studies have shown that gambling produces a state of subjective excitement and increased heart rate. Wins, delivered at variable ratios (reward interval schedules) produce states of excitement. Repeated pairings condition this arousal to stimuli associated with the gambling environment. Through second order conditioning, gambling cues elicit an urge to gamble, which results in a habitual pattern of gambling. Thus excitement can be experienced in anticipation, during or in response to exposure to gambling situations or cues. This process of conditioning can be used to explain gambling as an addiction produced by the effects of positive and negative conditioning, tolerance and withdrawal (Blaszczynski 2000).

Development of cognitive schemas (patterns of thinking). This is superimposed on the conditioning framework and irrespective of whether or not an addiction type model is adopted. Early and repeated wins result in irrational belief structures that promote gambling as an effective source of income. These schemas shape illusions of having control, biased evaluations and judgments, erroneous perceptions, superstitious thinking and faulty understandings of probability (Blaszczynski 2000).

The reinforcing properties of gambling and the irrational cognitive schemas combine to consolidate and strengthen habitual gambling practices. At this point, the downward spiral of gambling takes its toll. When gamblers lose they attempt to recoup losses through further chasing, which results in accumulating financial debts. Despite acknowledging the reality that gambling led them into financial problems, they irrationally believe that gambling will solve their problems (Blaszczynski 2000).

Ecological determinants. These revolve around public policy issues that promote availability and access to gambling facilities. **'**Substantive data clearly demonstrates that the incidence of pathological gambling is inextricably tied to the number of available gambling outlets' (Abbott and Volberg 1996; Volberg 1996; PC 1999; cited in Blaszczynski 2000: n.p.). Research into the effect of EGM accessibility on problem gambling has demonstrated that as opportunities to gamble increase, exposure to products increases; which in turn impacts on the level of gambling engagement. Marshall (2005) compared the data of 1,018 local residents of the Richmond-Tweed region of NSW, Australia, with local provision of gambling facilities in the area, measured by EGMs per capita. Findings showed that participants residing in the more heavily provisioned EGM environments tended to gamble more often and spend more money on gambling, than those who resided in less saturated areas. Marshall (2005) concluded that the physical gambling environment in Richmond-Tweed may be stimulating population gambling behaviour at the local level. Livingstone (2001, 2001a) draws similar conclusion based on analysis of Victorian EGM data, suggesting that there is a relationship of causality between EGM density and rates of consumption, a relationship further related to the socio-economic factors and social class, in that socio-economically disadvantaged communities appear to experience predictably higher densities of EGMs than more affluent areas, with a consequent effect on rates of consumption.

The 'pathways' model is put forward primarily as a framework for clinicians, as a "conceptual framework that attempts to integrate research data and clinical observation to assist clinicians in the identification of distinct subgroups of gamblers requiring different treatment strategies" (Blaszczynski 2000: n.p.). However, the model provides a summary of major strands of thinking about problem gambling emerging from the clinical or treatment setting.

A more recent approach proposed by Zangeneh and Haydon (2004) is a 'psycho-structural cybernetics model', a theoretical approach which seeks to address the complex interactions between individuals and structure that lead to problem gambling and its maintenance. Within this model it is proposed that both negative and positive feedback to the individual can lead to gambling problems. In the case of negative feedback, faulty or irrelevant incoming information held by individuals may produce erroneous (gambling) behavioural output (2004: 3). On the structural level, the offers and inducements portrayed in advertising may also be influential, particularly when operating as contexts for individuals who already hold erroneous cognitions. In the case of positive feedback, early or relatively large wins on the individual level may combine with structural contexts emphasising wealth creation, risk and chance ideology (Zangeneh & Haydon, 2004: 5). The interrelationships between individuals and structure and the 'feedback' of information processing are thus argued to provide a way of thinking about problem gambling that integrates relatively micro- and macro-social factors.

These recent theoretical perspectives on problem gambling tend toward broad analytic and explanatory frames. Nevertheless, it is possible to see connections between these broad conceptualisations of problematic gambling and the narrower concern of the researchers with

harm associated with EGM gambling and its particular technological platform. For example, it appears that two of the major determinants that are argued by Blaszczynski to confront all gamblers, namely processes of conditioning through the offer or receipt of rewards and the development of cognitive schemas, are likely to have direct relevance to the nexus between gaming machine technology and gambling participation. The third determinant, which Blaszczynski terms ecological, can be broadly interpreted as the contexts of all machine gaming, including in particular those elements and their parameters described in this paper as comprising the EGM technical system.

Behaviourist or learning theories

Behaviourist theories conceptualise persistent gambling as a conditioned process. This theoretical orientation is described by Griffiths and Delfabbro (2001):

> … both classical and operant conditioning principles have been applied to the study of gambling. In operant explanations for problem gambling … persistent gambling is seen as a conditioned behaviour maintained by intermittent schedules of reinforcement, most likely a variable-ratio schedule. This involves the provision of infrequent rewards after varying numbers of responses. On the other hand, proponents of classical conditioning models…argue that people continue to gamble as a result of becoming conditioned to the excitement of arousal associated with gambling, so that they feel bored, unstimulated and restless when they are not gambling …

In particular, the combination of event (or stake), the result of win or loss and the time-gap between each gamble win is said to contribute to the 'addictiveness' of gaming machines (Griffiths & Parke, 2003). EGMs may be readily conceptualised as devices utilising highly developed concepts of reinforcement in order to maintain desired behaviour.

Studies based on behavioural/learning theories make up one of the largest bodies of sustained experimental work in relation to the influence of the properties of gaming machines on the behaviour of gamblers. The offers and attractions of rewards can be seen as crucially important in this group of studies. Wins and near misses appear to affect both the rate of gambling and the longevity of gambling sessions. The ability to continuously stake on gaming machines encourages the flow of the gambling session. Physical features of the machines, such as lights, sounds and the rapidity of the action are also likely to maintain arousal and excitement, potentially inducing excessive gambling. There is clearly a considered body of work that places the characteristics of the key element of the EGM technical system, the machine unit itself, at the centre of questions about the nexus between EGM gambling and problem gambling. This suggests that an avenue of further enquiry for the researchers could be to seek information or data on transformations in the appearance and performance of EGMs and any perceived or documented link with changed patterns of gambling behaviour.

Need-state models and theories of addiction

Need-state models conceptualise gambling as a form of psychological or physiological dependence, with the associated assumption that people gamble to escape unpleasant feeling states such as anxiety, depression or boredom (Griffiths & Delfabbro, 2001).

Diskin and Hodgins (1999) suggest that for those with gambling problems attention may become relatively intensely focused on the gaming machine. This can mean that it is more difficult for other elements of the context in which the gambling is taking place to distract the gambler from the machine.

Table C1: Gaming machine features and gambling behaviour, need/state approaches

Salient dimensions of gaming machine design in the acquisition of gambling habits and gambling problems	Method	Source
Narrowing of attention (dissociation) Pathological gamblers may experience a greater narrowing of attention than occasional gamblers when engaged in VLT play. Pathological gamblers were slower than occasional gamblers in reacting to irrelevant light stimuli while playing on a demonstration VLT. They were significantly more likely to report more symptoms of general dissociation as measured by the Dissociative Experiences Scale.	12 problem VLT gamblers (as identified through the South Oaks Gambling Screen) were compared to a group of 11 occasional VLT gamblers.	Diskin & Hodgins, 1999

Cognitive theories

Cognitive theories, broadly speaking, attribute excessive gambling to erroneous beliefs and thought patterns regarding the likely profitability of gambling. For example, "irrational thinking may be related to problematic gambling behaviour … with persistent behaviour thought to be the result of people's overconfidence in their ability to win money and associated misconceptions" (Griffiths & Delfabbro, 2001). These misconceptions are frequently said to include an overestimation of control over the gambling process and of the gambler's own skill level. As with the psychological theories described above, Griffiths and Delfabbro (2001) argue that the evidence for this theory as a unitary explanation for the aetiology of gambling problems is inconclusive.

Studies of gambling and problem gambling behaviour that are based in cognitive theories focus on the relationship between gamblers understandings and expectations of gambling and their 'objective' chances. These theories posit a kind of 'gap' between gamblers cognitions and 'reality'. These theories inevitably suggest that gamblers 'misrecognise' the rules and/or chances that are embedded in the structure of gambling. The 'gap' between gamblers' cognitions and the objective structure of gambling (gambler's fallacies) may also be stimulated and reinforced by particular characteristics of the various gambling forms. In the case of EGM gambling, Walker (1992) points out that many gamblers continue to believe that each spin of the reels is not an independent event, but rather part of a sequence.

Delfabbro (2004) has recently argued that information provided to gamblers in the guise of correcting irrational beliefs (which he also argues are not always as irrational as they may superficially appear) must be very carefully considered, and suggests that current harm minimisation messages may well be either ineffective or confusing. He further suggests that the cognitive approach to gambling research (in which irrational thinking is thought to explain much behaviour) may be quite limited in value, given that many non-problem gamblers share 'irrational' beliefs about gambling and that many gambling problems thought to have cognitive origins may be well explained from a behaviourist basis (Delfabbro 2004).

Although EGMs are random in their operation and each event is independent of all events preceding it, the gambler's fallacy remains that an internal logic to the sequence of events (bets) exists (SACES 2004b: 10). This is represented in colloquial language which may refer to gaming machines as 'hungry' (not going to pay out soon) or 'hot' (about to pay). A laymen's version of the 'law of averages' suggests that playing for longer increases the

chances of a big win. Whilst the erroneous cognitions that underlie gambler's fallacies are no doubt important, the researchers consider that the consumption of gambling is also related to broader socio-cultural factors, such as pursuit of consumption in the guise of an opportunity to apparently engage in a windfall financial system analogous to that portrayed in business and other media and popular culture. The logics of 'calculated risk-taking' in an 'enterprise culture', or of having to 'be in it to win it' or 'nothing ventured, nothing gained' are colloquialisms that capture essential components of the apparently requisite value system of self-reliant individuals in contemporary capitalist societies.

Given this broader context, the most persuasive feature of gambling in relation to cognitions is likely to be the expectation of winning. 'Irrational' thinking, such as the inevitably of winning if enough time and money is 'invested,' can lead individuals to continue to gamble beyond what they can afford, in search of the win that will 'change their life'. This can have potentially harmful consequences when combined with behavioural reinforcements such as near wins, which may reinforce the thinking that a win is 'just around the corner'. The capacity of EGMs to provide relatively frequent rewards (small wins) and evidence of proximity to a big win (near misses) can thus be understood as particularly effective in relation to both learning and cognition approaches. A number of studies have combined elements of these (behavioural and cognitive) theories in experiments with gambling behaviour (Table 5.4 below).

We have also noted that a number of problem gamblers interviewed for other projects undertaken by the current researchers have reported that 'free spin' features of some EGM games is an extremely attractive element of the cycle of play. Generally, a particular combination of symbols appearing on the screen or some part of it will initiate a period during which a number of 'free spins' occur, during which prize values are often increased by as much as 100%. Players interviewed for this research have identified this as very influential in their playing behaviour, and many report that they select machines for play on the basis that this feature is provided by the selected game. Walker (2001) has also reported on this element and noted its importance to and influence on the behaviour of regular and problem gamblers.

Delfabbro and Winefield (1999) make an explicit link between 'machine events' and the response rate (rapidity) of gambling behaviour. However, they link these together both through behavioural patterns embedded in the operation of machines and through the cognitions that structure gamblers' reasoning about their gambling behaviour. Sharpe *et al*. (1995) further widened the behavioural component of gambling to also encompass the stimulus provided by the gambling environment, not just by the gaming machine itself. This would suggest that modifications and transformations in the layout and presentation of EGM venues should not be discounted in terms of its affect on patterns of gambling behaviour and potentially the development of gambling problems.

The studies reviewed support the view that the distinctive properties of machine-based gambling may embody certain characteristics that make this form of gambling a special case in relation to problem gambling. This body of research, predominantly utilising learning and cognitive theories, suggests that the facility of machines for intermittent reinforcement, rapid play, constant reward (however conceptualised), various cognitive illusions, excitement and arousal through sensory stimulation, and the narrowing of psychological attention may be crucial factors in understanding any nexus between gaming machines and problem gambling. These factors appear to be relevant even when broader social and cultural factors are also seen to be of crucial importance.

EGM Features & Problem Gambling Behaviour

There are a smaller number of studies that place the characteristics of gaming machine technology at the centre of analysis of machine gamblers' behaviour. These studies are diverse in rationale and intention, but what they have in common is a focus on gaming machines as key to the acquisition or production of particular patterns of gambling behaviour, including the potential for such patterns to be problematic or harmful. A summary of these studies is provided in the table below.

Table C2: Gaming machine features and gambling behaviour, selected other studies

Salient dimensions of gaming machine design in the acquisition of gambling habits and gambling problems	Method	Source
A range of characteristics (as applied to gambling in general) • Event frequency (time gap between each bet) • Stake size (including issues around affordability, perceived value for money) • Amount of money lost in a given time period (important to chasing) • Prize structures (number and value of prizes • Probability of winning • Size of jackpot • Skill and pseudo skill elements • 'Near miss' opportunities • Light and colour effects (egg red) • Sound effects • Accessibility (opening times, membership rules, number of outlets, location of venue) • Type of gambling • Advertising • Rules of the game • In general, structural characteristics that promote interactivity and to some extent define alternative realities and allow feelings of anonymity. • Social or asocial nature of the game.. 'One of the major influences of technology appears to be the shift from social to asocial forms of gambling. From this it could be speculated that as gambling becomes more technological, gambling problems will increase due to its asocial nature' (273). '…technology is essentially turning gambling from a social pastime to an asocial one' (279). • Situational characteristics impact most on acquisition and structural characteristics impact most on development and maintenance most important accessibility and event frequency (280). • Theories about why people gamble need to take into account the needs and motivations of the gambler and their interaction with environmental stimuli.	Critical review	Griffiths, 1999b UK, based on fruit machine technology.
Colours It was noted that black, red and purple are the most common colour scheme in arcades. Novice gamblers placed more bets and lost more money with red lighting in the venue as compared .to blue lighting.	Research as part of proposed harm minimisation measures in NSW. See section 5.5.	Popkin, 1994; Stark, Saunders & Woo key, 1982, cited by Blaszcyynski *et al* 2001

Gaming machine features and gambling behaviour, selected other studies (continued)

'Addiction' to gaming machines results from an integrated mix of situational and structural characteristics of machines, biological, psychosocial or genetic predispositions and the interaction between the player and machine Characteristics of EGMs which contribute to problematic gambling include: • Hidden odds whereby people often have no idea about their chance of winning a large prize. • The mapping or weighting of the virtual reel to the physical reel (for slot line games) means that the visual reel that the player interacts with gives a false impression about the true odds making wins seem more plausible than they are. • Apparently low stakes of each bet. • Prize structure – small & medium prizes help establish and maintain the behaviour through positive reinforcement. Also the possibility of a larger win sets up the expectation of a big pay-off and encouraging hope, despite substantial losses.	Discussion of the role of knowledge & information: how machines work; common myths; various machine features and the relationship of features to addictiveness potential.	Turner & Horbay, 2004 Canadian, based on VLT technology.
Machine structural characteristics The authors describe the importance of a number of machine characteristics: • Development of 'features' & their relation to types of win, bettor involvement, skill & choice. 'Winning through features' refers to winning money via the machine's play rather than simple reel order. • Near miss (& its changing role with new technology, including increased use of 'features', 'repeat chances' & 'credit teasing') '*The gaming industry appears to have adapted and strengthened the near miss by connecting it to the 'feature' play (rather than 'reel order').* • Payout interval/event frequency • Familiarity characteristics (naming, appeal and persuasion – such as when a popular show like The Simpson's is used) • Sound effects (music and verbal interaction) • Light & colour effects (suggestion that people may gamble more under red lighting and with red decor) • Features that facilitate the suspension of judgement such as in the use of tokens rather than real money. • Features that stimulate the illusion of control through personal involvement, perception of skill and familiarity with a particular machine. • Win probability	Analytical piece including literature review and findings from research. The review changes in structural characteristics of the UK fruit machine over the last decade.	Parke & Griffiths, 2004 UK, based on fruit machine technology.

Gaming machine features and gambling behaviour, selected other studies (continued)

Various: commercial modification of gambling behaviour Machine interactions • Flash up signs 'you're too good for me', 'you're a legend' • Make pay out intervals shorter • Increase 'multiplier potential' • Increase 'near misses' (Frustration Theory) – failing to fulfil a goal produces frustration which energises behaviour, therefore provides a role for staff to be verbally encouraging and the opportunity to provide more incentives to stay • Skill level encourages player to be more active in the game thereby focusing on the relationship between the machine and the player. The individual believes they are skilful even though the machine is stimulating the illusion of control through the player's personal involvement. Perception of skill is linked to familiarity with the machine. Light & sound • Research indicates red lights in the venues had a less inhibitory effect than blue lights • UK arcade interiors are usually decorated in the red end of the colour spectrum, lighting is dim to increase the focus on the flashing lights of the machine. Even when not many people are present in the venue this lighting gives the effect of a party atmosphere with lots of noise and flashing lights. UK research found that dim lighting increased verbal latency and reduced eye contact which led to more gambling and less social interaction • Dark background, no natural light (windows to have dark drapes), dim lights, rooms to be warm and cosy, 'Muzak' style music that does not provide any competition to gambling. Venue layout • Position ATM and smoking facility within view of poker machines • Replicate surroundings of gaming room in smoking facility • Consider provision of facilities in smoking room (for example, TAB, Sky Channel, Keno, Chocolate Wheels, raffles, large TV screen, comfortable seating)	A summary of much of the literature, but oriented to pragmatic solutions to a particular commercial problem: How to encourage people who are smokers to continue gambling in non-smoking environments?	Barrington Centre Pty Ltd, 2002 Australian, proposals for Victorian EGM market, based on Australian and UK research.
Novelty "It is a well known phenomenon that players enjoy new machines, presumably because they offer novel visual and sound effects that increase the enjoyment of the machines and presumably result in increased profits"	Research as part of proposed harm minimisation measures in NSW. See section 5.5.	Blaszcyynski, Sharpe & Walker, 2001 Australian, based on EGM technology

Gaming machine features and gambling behaviour, selected other studies (continued)

The psychology of familiarity Other innovations in fruit machine design tap into the psychology of familiarity. Three areas that appear to have relevance are familiarity and its relationship to naming, appeal, and persuasion. When tied in with more recent research on the psychology of familiarity, the names of machines do seem to be critically important – particularly in terms of gambling acquisition. It is now quite often the case that fruit machines are named after a person, place, event, television show or film. Not only is this something that is familiar to the fruit machine player but may also be something that the potential players might like or affiliate themselves with.	Analytical review	Parke & Griffiths, 2004 UK, based on fruit machine technology but with wider applicability.
Computerization The involvement of gamblers with computerized technology was found to influence the rate of onset of problem gambling behaviour. Gambling on video slots or video poker associated with a significantly faster rate of onset of problem gambling behaviour for both men and women. Characteristics of computerised gambling said to influence the rate of onset of problem gambling: • Rapidity of play • Continuity of play • Repetitiveness of play	Three sources of data studied for a sample of 180 gamblers seeking treatment for a variety of gambling problems.	Breen, 2004 USA, based on slot technology
Machine parameter modifications A series of six machines were used which varied in play-speed, illumination levels, sound, form of outcomes and the availability of betting lines and other game features. Variation in such parameters varies factors such as reinforcement schedules etc. Player preferences were found to be most strongly influenced by play-speed, number of lines available and sound. Players preferred gambling on machines that were faster, provided more betting lines and sound. Little evidence that modification to machine 'aesthetic characteristics' changes player interest with the exception of sound. Frequency & magnitude of reinforcement both important but frequency more so. 'Subtle variations in slot-machine design can have a significant effect on player preferences and behaviour' (2004: 24). However, no evidence that parameter modifications would be isolated in their effects to problem gamblers. Modifying parameters may reduce the enjoyment of all gamblers.	Laboratory study of behavioural and subjective effects on the gambling preferences of regular EGM gamblers, of various machine parameter modifications. Methodology queried by Blaszczynski *et al* (2003) on basis that variables manipulated under laboratory condition are decontextualised	Delfabbro, Falzon & Ingram, 2004 Australia, based on EGM technology

	from the conditions in which their effects are usually experienced.	
Gambling stopping device The study investigated whether a stopping device, which enabled participants to voluntarily stop the spinning of a machine's reels, would alter participant's beliefs about the level of control they had over the outcome of the game. Findings showed that the stopping device increased a number of players' beliefs that it is possible to control the outcome of the game; that skill can be a factor in influencing the game outcome; and that using the stopping device leads to a higher degree of success. Furthermore, the study found that the stopping device encouraged participants to keep playing, with participants that had access to the device playing twice the number of games than those participants that had no access to the device	A Canadian study investigated the effects of a stopping device on players' illusions of control and gambling persistence.	Ladouceur & Sevigny, 2005.

The studies summarised above, place aspects of gaming machine design at the centre of understandings of patterns of gambling behaviour. They are based on a variety of forms of gaming machine technology, including fruit machines (UK), VLTs (Canada), slots (US) and EGMs (Aust.). Many of the aspects of machines discussed can be considered 'generic' to all gaming machines, for example naming, lighting and sound. However, none of the research reviewed to date provides critical comparison of the various forms of gaming machines. In particular, differences and commonalities in the actual game features of various forms of gaming machines remain undocumented and unexamined in the literature. As a consequence there appears to be, as yet, no systematic consideration of the role of different features and formats of the games themselves in the production of patterns of consumption of EGM gambling, and their potential relationship to harmful gambling behaviour.

Reporting the results of a qualitative study into problem EGM users Livingstone (2005) indicates that the majority of gamblers interviewed advised that obtaining free spin features on EGMs was an important consideration in their choice of strategy. The achievement of the game feature was regarded as a major goal of EGM use and this determined choices about whether to bet high or low stakes and how many lines to play, and indeed whether a particular EGM was attractive or otherwise.

In a theoretical discussion of some gaming machine parameters, Lepper and Creigh-Tyte suggest that the machine parameter most likely to determine EGM expenditure levels is the maximum bet size. However, they also indicate that verification of this conclusion will require significant empirical research and subsequent development of a dynamic model to predict EGM consumption (Lepper & Creigh-Tyte 2005).

A range of characteristics of gaming machines is cited in the literature reviewed as contributing to the nexus between gaming machine technology (and its context) and gambling behaviour. It is interesting to note the interpretations of the literature made in the interests of solving a 'commercial' problem (Barrington Centre 2002). Manipulation of machines and their contexts, in the interests of modifying the gambling behaviour of a particular group (smokers) in the context of a ban on smoking in EGM gambling areas, is described as a coordinated and holistic strategy. Such a strategy involves the technical system (machine performance, lighting, venue modifications), service factors (staff encouragement of wins, awareness of body language alerting need for refreshments), incentives and promotions, and other factors (Barrington Centre 2002). As an intentionally commercial strategy, which is designed to encourage unbroken or continuous gambling (Barrington Centre 2002), it incorporates a variety of the psychological triggers and social and contextual elements that are discussed and described in the research literature. This would add support to Griffiths (2001) claim that no single theoretical perspective within the literature on gambling and problem gambling should be seen as sufficient to provide a 'unitary' explanation for either patterns of gambling behaviour or the tendency for some gamblers to experience harm from gambling.

Harm minimisation strategies

Government legislation has also recognised the role EGM features play in contributing to problem gambling. In 2002, the Victorian Government introduced the Gaming Legislation (Amendment) Act 2002 which banned $100 note acceptors; prohibited the increase of machine spin rates above 2.14 seconds; banned autoplay facilities; set a maximum bet limit of

$10 and made it mandatory for machines to display information about the odds of winning and the amount of time and money the player had spent (in SACES, 2005).

In 2001, Queensland introduced an upper limit of $20 as the maximum denomination accepted by EGMs. The Office of the Government Statistician conducted two studies to examine the effects of this new policy on gambling behaviour (see Brodie, Honeyfield and Whitehead, 2003). A significant proportion of participants in the study reported reductions in the amount of money and time spent playing EGMs, a reduction in the size of bets placed and a reduction in the frequency of visits to EGM venues. Furthermore, those participants at high risk of problem gambling reported the greatest change in behaviour, with 30-40% reporting a reduced amount of money and time spent on EGMs, reduced levels of enjoyment and a decrease in visits to EGM venues. Interestingly no long term changes in consumer net loss was observed, an unexpected finding of the new policy had a positive effect on problem gambling behaviour. The researchers concluded that either respondents were not actually behaving as they reported, or alternatively the impact of the behaviour change is of only minor economic consequence, which questions the assumption that problem gambling is a significant contributor to all gambling revenue (Brodie, Honeyfield and Whitehead, 2003).

In Nova Scotia, Canada, a number of responsible gaming features have been added to new machines since 2001. These features include: permanent clocks; pop up reminders that inform players how long they have been playing and ask whether they would like to continue; a display of the amount players have spent in dollars; and limits on the amount of time players can play for. Such changes were in response to research that had found problem gamblers had difficulty keeping track of time; difficulty keeping track of the money they had spent; and the mesmerising effects of the sounds and lights employed by machines (Nova Scotia Alcohol & Gaming Authority, 1999, in SACES, 2005).

Gaming machine manufacturer, International Game Technology (IGT), provides an example of the gaming industry response to problem gambling in the United States. IGT argues that they have adopted a very proactive role in promoting responsible gambling to the company's employees, customers and to the general public, and supporting and providing funding for organisations and programs that are committed to research, prevention and treatment of problem gambling (Jones, 2005). In particular, IGT has developed a series of 'pop-up' and similar messages and information modules that appear on EGM screens to assist in preventing loss of control. However, as noted elsewhere in this review, Delfabbro (2004) has suggested that such messages need to be very carefully designed if they are not to reinforce some mis-beliefs about 'luck', chance and gambling activity.

Key studies relating to the nexus between gaming machine technology and harm minimisation are summarised in the table below.

Table C3: Gaming machine features and gambling behaviour, harm minimisation measures

Salient dimensions of gaming machine design in the acquisition of gambling habits and gambling problems	Method	Source
Modification of technical parameters of machines The use of bill acceptors did not appear to be reliably associated with problem gambling status, severity of problem gambling, amount of money lost or persistence of play. Reduction in reel spin would be unlikely to reduce problems with EGM gambling and could lead to an increase in indirect social/family harm for a small proportion of problem gamblers. Reducing the maximum bet size from $10 to $1 led to players gambling for shorter periods, making fewer bets and losing less money. It was considered reasonable to assume that problem gamblers were affected more than recreational gamblers.	Three conditions were tested for among recruits in a field study in participating clubs and hotels: - reconfiguring bill acceptors so that they do not accept $100 or $50 bills; - slowing reel spin speed; and - reducing the maximum bet from $10 to $1. The three measures subjected to study were part of a set of gaming machine operating parameters being considered by the Liquor Administration Board as the administrative body for approving gaming machines in NSW.	Blasczcynski, Sharpe & Walker, 2001 Australian, based on EGM technology
Harm minimisation messages Three messages were evaluated as the most effective: • Have you spent more on gambling than you intended? • Are you gambling longer than planned? • Have you felt bad or guilty about your gambling?	Qualitative study in which respondents trialled EGMs with ten harm minimisation messages running consecutively on one machine and randomly on another. Respondents answered a questionnaire and participated in a focus group.	Consumer Contact, 2003 Australian, based on EGM technology
Modification of technical parameters of machines Findings on recommendations of Blasczcynski *et al* (2001): - reconfiguration of bill acceptors a potentially effective harm minimisation only when implemented with other strategies, e.g. in relation to proximity of ATMs; - reel spin modification does not appear, at this stage, to be an effective harm minimisation strategy; and - reduction in maximum bet size shows strong potential as a machine-based harm minimisation measure.	Review of Blasczcynski, Sharpe & Walker (2001) and CIE (2001) for NSW Department of Gaming and Racing. Raised questions about the reliability of results from a field study where 'naturalness' of setting is disrupted by presence of researchers.	Centre for Gambling Studies, University of Auckland (Tse, Brown & Adams), 2003

Gaming machine features and gambling behaviour, harm minimisation measures (continued)

Responsible gambling features On average, the percent of times players reported losing track of time and money, or playing beyond desired time limits declined for all players, but most strongly among those taking up regular play on the new terminals (Adopters); Adopters experienced a significant decline in the average percent of time they reported spending more money than they wanted; There was a significant decline in session length associated with play on the new terminals over the course of the study. Despite a reduction in the amount of time spent playing on the new terminals, there were no significant changes in the average amount of money spent each time played, within any of the player groups or at a total level. On a machine basis there was an increase in the rate of expenditure and, consequently, an overall increase in revenue associated with the introduction of new machines might be expected. The new terminals tended to attract those players who were already more involved in VLT play prior to the introduction of the new machines, but were equally likely to be adopted by players at Low, Moderate or High risk for problem gambling. Only those at no risk were less likely to have taken up play on the new machine. It may be that simply introducing new terminals will attract those who are most likely to derive benefits from any measures intended to assist players in managing their gambling. Exposure to the 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, although (as yet) it had no measurable effect in reducing session length or expenditure. There are other play behaviours and machine characteristics that had a significant effect for changes in session length and expenditure on the new terminals and in some cases influence or override the effectiveness of the features.	In 2000, the Nova Scotia Gaming Corporation announced that it would be replacing 3,200 VLTs with new or modified machines with 'responsible gambling features' designed to discourage excessive play. Introduction of these machines began in 2001. The changes introduced to the machines included new games and improved graphics, the addition of a bill acceptor and four features to support players in managing the amount of time and money spent. Specifically the features comprised of: - a permanent on-screen clock denoting the time of day; - a display of betting activity in cash amounts rather then credits; - pop up reminders of time spent playing after 60, 90 and 120 minutes of continuous play; and - a five minute cash out warning at 145 minutes of continuous play and mandatory cash out at 150 minutes. A questionnaire and 3 follow-up surveys were conducted with gamblers recruited in gambling venues. The quantitative study was preceded by qualitative focus groups, interviews and observation of VLT gambling with RGFs in place.	Schellinck & Schrans, 2002 Canadian, based on VLT technology

Gaming machine features and gambling behaviour, harm minimisation measures (continued)

Responsible gambling features Varied the parameters of a spinning reels and a video poker game: • Speed of play • Sounds • Display running counter • Disabled touch screen Slower speeds and muting sound decreased enjoyment levels, and 'pathological' gamblers found it easier to stop gambling with the running counter in view.	See Table 5.1 for details	Loba, Stewart, Klein & Blackburn, 2001 Canada, based on VLT technology
Pre-determination counteracting effects of 'impaired control' To prevent gamblers who have regular EGM gambling involvement being vulnerable to the effects of impaired control a set of technical measures may be available to enable the pre-determination of the scale of gambling activity, to enhance the effectiveness strategies used by 'in control' gamblers such as setting strict time limits, setting strict monetary limits or avoiding venues. Pre-determined gambling parameters might be carried on an identity card readable at the central gaming network server level through card readers at the venue level. "In the context of the current trend toward cashless gambling/gaming there is now both the knowledge base and the technology to enable governments to develop a consumer protection environment that balances the individual freedom of the player with the opportunity for the community to prevent problem gambling and underage gambling 'at a stroke'… (could be applied to all new gambling products as they emerge) and could be fully automated and web based (2003: 25).	A broad study involving using quantitative and qualitative methods into the psychological factors involved in the "impaired control" that places gamblers at risk of becoming problem gamblers. Gamblers who have regular and sustained EGM gambling sessions, find this emotionally stimulating and/or a distraction from life pressures are liable at some time liable to suffer impaired control over the parameters of their gambling activity (time or money in particular).	Dickerson, Haw & Shepherd, 2003 Australia, based on EGM technology
Awareness and perceptions of effectiveness of responsible gambling measures Specific measures evaluated include: signage and information; gambling environment (clocks, lighting etc.); restriction of access to cash; self-exclusion; responsible advertising and promotion. Approximately two-fifths of respondents had changed their gambling behaviour in some way due to responsible gambling measures. Specific measures and different population segments results are clearly tabulated and discussed. Almost one-fifth of respondents scored as 'problem gamblers'.	A mail survey (n=706) and an in-venue survey (n=248) were conducted with NSW Club patrons looking at: EGM gambling participation; awareness of, and opinions of adequacy and effectiveness of, Club responsible gambling measures; screening for problem gambling using VGS screen.	Hing, 2003 Australia, based on EGM technology

Another paper examining the nexus between EGM technology and harm minimisation measures is Dickerson *et al*. (2003) who suggest the exploitation of technical capabilities to allow gamblers to 'pre-determine' the extent of their gambling activity (see also PC 1999: 16.71 for a discussion of pre-determination). Parameters delimiting spending, and duration and location of gambling activity could be carried on an electronic card able to be read at the EGM network server level. This would set limits on gambling when an individual 'logged on' to gamble. This could prevent gamblers becoming at-risk where control became impaired due to gambling for too long, for example. It would appear that for this to be effective gaming machines would have to be modified with smart-card readers, and all gamblers would require such a card to gain access to and continue to play any EGM linked to the network. EGMs would also have to be cashless (i.e., the smart card would be loaded with credits) or the EGM would be inoperable without a smart card in place, so that no credits could be purchased or games conducted unless that condition was met.

Privacy concerns and the potential for gamblers to utilise a number of card 'identities' (and the potential trade in cards) appear to require careful consideration. It is also important to carefully consider the regulatory environment within which any such smart-card system might operate. For example, in the Victorian context the operators could introduce a network wide smart-card system which provided them with very good quality data about the demographic and gaming characteristics of their customers, providing an excellent marketing tool which may to some degree confound the perceived harm-minimisation characteristics of the intervention. Alternatively, a third party might be contracted by the regulator to manage the smart-card system, and privacy concerns might be addressed by avoiding any electronic linkage between the data contained on the card and the identity of the card holder. Further, if the system were to avoid generating a wholesale 'trade', the integrity of the system would have to be high (i.e., of the same standard of that pertaining to driver licences) thus incurring not inconsiderable costs.

However, integrating gambling consumption more fully into a system of checks and balances common to everyday electronically-based commercial transactions, such as those that accompany credit card use, would appear to provide a framework for some potential solutions to these problems. Support for the technical feasibility of such a system at the machine level has been voiced by at least one major gaming machine manufacturer (Aristocrat 2003).

A study by the Centre for Gambling Education and Research (CGER) examined gamblers' attitude towards cashless gaming technologies in NSW (Nisbet 2004), estimating the number of cashless gaming machines operating in NSW to be 695 (0.7 per cent of the EGMs in the state), all of which are situated in four venues (Nisbet 2004: 3).[16] The study asked respondents about a number of aspects of the card-based cashless gaming system including its usefulness in aiding spending management, and the availability of a player activity statement (PAS), detailing gambling transactions.[17] Nisbet found that "consumers do not believe that card based technologies would help them manage their spending", but that they "believe that the player activity statement is a useful feature" (2004: 18). Nisbet (2004: 18) concludes that there "is no evidence to suggest that a voluntary, card based gambling scheme offers any significant protection to gambling consumers relative to that offered by other responsible gambling measures".

[16] "Approximately 20 venues in NSW are approved to operate cashless card based systems…the number of additional machines for which card based functionality is planned…is estimated at 3000" (Nisbet 2004: 3 fn 1).
[17] Under the NSW *Gaming Machine Regulations* 2002 all EGM card and account holders may request monthly player activity statements and/or transaction records (Nisbet 2004: 4).

The strength of Nisbet's conclusion may be qualified somewhat, however, by the ambivalence of the study's findings. It is not difficult to imagine that should the PAS prove to be a 'useful feature' then its usefulness may well be in the area of managing expenditure. Further, 70.5 per cent of respondents to the study had never used a cashless card, with Nisbet's analysis showing a "significant correlation" between those who have used or continue to use a cashless gaming card and those who *do* believe the card helps expenditure management (Nisbet 2004: 13). This ambiguity in understanding the potential and actual adoption of technology may present a significant domain of risk in this area. In preliminary venue consultations undertaken by the researchers in Victoria, concerns have been voiced about the practicality of card technologies. For example, in one small club gaming venue with a relatively aged member/client base, management considered the introduction of cashless cards would definitely require significant adjustments on the part of gamblers and a level of assistance from venue staff. At the same time, members of this club had successfully adapted to a card-reader system for club entry and access to member benefits in recent times, following considerable effort in training and assistance from club staff. Distinguishing perceptions about, and actual experiences of, technologically-based harm minimisation measures thus appears to require careful consideration by interested parties and policy-makers alike.

The *Final Report* (2004) of the IPART inquiry in NSW made 108 recommendations designed to foster a 'responsible gambling culture', 45 of which related to "measures to protect gamblers" (2004: 164). Many of these recommendations were not advocating new protective measures, but rather the retention of current measures or the further investigation or rejection of new or further restrictions. Key technical measures that were recommended for introduction were the inclusion of permanent on-screen clocks on all gaming machines (2004: 55-6), and the use of 'pop-up' messages on EGM screens warning gamblers they had been gambling continuously for 60 minutes (2004: 58-60). The technical implementation of clocks appears relatively straightforward if incorporated into all EGMs approved in the future. However, the definition of what constitutes a 'continuous' gambling session that would trigger a pop-up warning message appears a little more complex in execution.

The IPART report took the view that more sustained and systematic research was required in relation to slowing reel spin speeds, modifying bank note acceptor or lowering the maximum bet. There is currently no restriction on reel spin speed in the NSW appendix to the National Standard, although the LAB *First Determination* (2003) had recommended a 3.5 second spin and 1.5 second idle as a reasonable standard. In the USGRU research on reel spin a fast reel spin was set at 3.5 seconds and a slow reel spin was 5 seconds (Blaszczynski, Sharpe & Walker 2001). Whilst noting that slowing reel spin speeds may help a small proportion of problem gamblers, IPART recommended that in the absence of "clear evidence" reel spins should not be slowed "at least in the short to medium term" (2004: 114).

Similarly, IPART did not recommend lowering the level of maximum bets primarily because there is no evidence available as to what the optimum level maximum bets should be fixed at in the interests of both problem gamblers and industry stakeholders (IPART 2004: 88-93). Instead it was recommended that research be undertaken to ascertain the optimal bet level for *stand-alone* gaming machines, taking into account the impact of a range of possible maximum bets on "problem and 'at risk' gamblers", recreational gambling, the "economics of the gaming industry" and any possible "unintended consequences" (2004: 93).

In relation to the modification of banknote acceptors, this measure fell into the category of those measures IPART proposed should be 'prioritised for evaluation', along with 'pre-commitment mechanisms, and cash limits for ATMs in gaming venues (2004: 98-104). IPART took the view that restrictions on note acceptors, the placement of ATMs and limits on ATMs need to be considered as a suite of harm minimisation measures. A key recommendation is that "linked research" should be conducted on these three "liquidity controls" (2004: 171). Other measures considered that were not recommended for restriction included: limits on EGM sound features; maximum wins on stand alone machines; the number of double-ups, further restrictions on EGM artwork, enforced payout levels, natural light in gaming areas, and gamblers being visible to those outside gaming areas; and the maximum number of carded games per reel (IPART 2004: 107-120).

The UK Government has proposed specific safeguards in relation to EGM technology, to be incorporated in "statutory instruments, license conditions and codes of practice" (DCMS 2004: 16), which "may include powers:"

- To control speed of play
- To control game design features such as "near misses" and progressive tiers, which may reinforce incentives to repeat play
- To require information about odds and actual wins and losses in the play session to be displayed on screen
- To require "reality checks" or the need to confirm continuing play
- To implement loss limits set by players before starting through use of smart card technology
- To vary stake and prize limits (DCMS 2004: 16-7).

The rationale for these intended safeguards is stated clearly in the Government response and tied to learning from the Australian approach to the expansion of commercialised gaming.

> We are deliberately avoiding the mistakes made in other jurisdictions, like Australia, where high stakes gaming machines in particular have been allowed to invade normal social spaces. Unfortunately the rate of problem gambling there is now over two per cent, over twice the rate in Great Britain. On the contrary, our proposals will lead to a significant reduction in the number of premises where gaming machines are available (DCMS 2004: 16).

Discussion

In summary, a variety of interventions have emerged in relation to the identified nexus between EGM technology, characteristics and features, harm minimisation measures and public policy. What is clear is that rigorous research into, and evaluation of, particular technical interventions, is becoming central to the process of public policy formation in relation to EGM (and other gambling) harm minimisation measures. There appears to be a developing interest in the EGM technical system as a potential 'tool' that can be deployed in the interests of those with gambling problems, or those who may be at-risk of developing problems.

The research reviewed provides ample evidence that reflection on the interface between the EGM technical system and gamblers is proceeding on a variety of fronts and from a variety of

theoretical perspectives. A number of dimensions are being and have been explored, incorporating much of the panoply of cognitive and emotional expectations and responses that are embedded in gamblers' relation to EGMs. Current research is far from exhaustive in this respect. However, recent approaches appear to be acknowledging the complexity of the EGM-gambler relation, and are now seeking to contextualise specialised research findings within a broader socio-structural understanding. Studies of social capital, leisure preferences and social networks have emerged, for example, which offer insight into they ways commercialised gambling can be understood as integrated into the social worlds of particular groups (Warde & Trampunolon 2002).

Research devoted to investigating and evaluating the development of EGM technology-based harm minimisation tools has emerged relatively recently. This research assumes that EGM technology has the potential for modifications or that new design principles could be introduced that could minimise the harm experienced by problem gamblers and importantly, could act in a preventative capacity in relation to 'at-risk' gamblers. However it now appears that the design of such interventions is not a 'common-sense' task and must be approached with caution.

There appear to be clear difficulties in the conduct of this kind of research informing this complex area, some of which are already being debated by some researchers (notably Blaszczynski *et al*., Dickerson *et al*., Delfabbro *et al*. and Griffiths). A key methodological difficulty appears to lie in the particular limitations of field studies or laboratory studies. Field studies which purport to being conducted in a 'naturalistic' setting are unable to account for the extent to which the gambling behaviour of participants, whilst 'under the microscope' of the researchers, replicates their usual gambling. The presence of the researchers and the special setting of this particular gambling session may influence individual gamblers, to a greater or lesser extent. In addition, no discussion has emerged about whether a proportion of problem or other gamblers actually have quite erratic patterns of gambling participation, such that even if the gambling displayed is relatively 'natural' it is not necessarily 'typical' of that particular gambler. Dickerson *et al*. (2003) certainly point in the direction of this problem in relation to the idea of control becoming 'impaired' during gambling sessions. However, whether this process of impairment whilst gambling is rapid, sudden, gradual or varied, is triggered by specific events or as a process of fatigue for example, remains uncertain.

It is also relatively clear that although there is evidence that certain key characteristics of EGMs (use of bank note acceptors, availability of jackpots, availability of 'game features' involving free spins) appear to be related to changed gambler behaviour the precise dimensions of these changes and the extent to which such characteristics causally relate to player behaviour is unclear, certainly in a readily quantifiable way. It is also unclear how key environmental factors (location and type of venues, availability of alcohol, structure and characteristics of gaming rooms, etc) influence player behaviour.

The limitation of laboratory studies lies in the extent to which the gambling behaviour observed clinically would be replicated in a commercial gambling context. This is particularly relevant given research that suggests cues such a sound, smell and lighting in gambling venues can play a role in arousal. The context of gambling is a key to understanding the EGM technical system, so in this respect laboratory studies must also be treated with due circumspection (as Delfabbro *et al*. 2004, for example indeed do).

In relation to the question of EGM technology and harm minimisation measures, a number of 'commonsense' questions also arise in reviewing the studies which make up what is

essentially the vanguard of work in this area. For example, in the testing of restrictions on bank note acceptors in the major study done to date (Blasczcynski *et al*. 2001), the parameter of the test was the elimination of $100 notes. However, the most common denominations of notes in circulation and use in Australia are $10 and $20 values, and for the majority of gamblers are likely to be used more frequently than $100 notes. Further 'common-sense' speculation might suggest that 'problem gamblers' would be *more* likely to feed incremental amounts, for example five times $20, into a machine than one amount of $100, than would recreational gamblers. This kind of practice (for example) could be one deployed by problem gamblers to give an illusion of control, or indeed could be a sensible 'tactic' deployed by someone who is perhaps 'at-risk' of gambling too much. Even recreational gamblers are likely to stagger their input of money into the machine as part of their own negotiations about how much they intend to spend gambling, which is clearly not always (and perhaps rarely) a 'fixed' amount at the outset of gambling but more likely to depend on 'how my luck is going'. As has been noted in this review, the distinction between beliefs held by 'problem' and 'recreational' gamblers is very difficult to differentiate. People who gamble moderately appear to have very similar patterns of belief about luck and to misunderstand EGM characteristics in similar ways to problem gamblers, but without the same adverse consequences accruing from their gambling.

There are thus likely to be continued significant methodological questions arising from research that attempts to assess the effects of varying the technical parameters of EGMs on gambling behaviour. It should be emphasised that this is crucial research and that, in part, the only way these questions will be clarified will be through analysing the disparities in results achieved in laboratory and field settings. At the moment this research appears to be in the early stages of developing both methodological grounds and testable hypotheses. This is a crucial stage in the development of a systematic and rigorous body of research that can explore the questions which some of the studies described have opened up in relation to EGM technology, gambling behaviour and harm minimisation. Such research on this nexus as has been done to date is, in the view of the researchers, potentially path-breaking in terms of gambling research and public policy, and should not be considered an attempt by researchers to establish the 'last word' on such questions or be criticised unfairly on such a basis. At this point in the process, the first steps have been taken in what will likely be an increasingly methodologically and technically sophisticated field of research endeavour and substantial and longitudinal studies should be vigorously promoted.

Analysis of the precise configurations of machines, credit values and other technical parameters that structure the EGM system offers the opportunity to draw a more meaningful quantitative picture of the consumption of EGM gambling. The configuration of the EGM technical system appears likely to shape and condition the consumption patterns and experiences of gamblers. At the same time gambling behaviour is likely to feedback into the configuration of the technical system, in the shape of gambling expenditures, preferences, risks and harm. This is characteristic of systems implementation under conditions of reflexive modernity (Beck *et al*. 1994), in which potential and actual consequences of that implementation process increasingly become incorporated into the ongoing refinement and re-production of the system itself.

Accordingly, although this project is focused on the relevance and role of gaming machine games and features it is important to locate the operation and effect of these within the broader system deploying EGMs, and in particular the regulatory and operational arrangements which constitute important elements of this system.

Implications of literature for current research

Areas of research 'agreement'

At present there are few areas of relevance to this project where published research unequivocally favours a particular view.

In relation to theories explaining the development and evolution of problem gambling behaviour, although there is no clear consensus as to causality there is agreement that EGMs or like gaming devices are more likely than other gambling modes to be associated with the onset of problem gambling behaviour.

Although not universally agreed the principal characteristics of EGMs which are commonly associated with or thought to be casually related to this higher incidence of problematic behaviour include:

- The continuous nature of EGM operation
- The operant conditioning effect embedded in the repetitive bodily actions required for sustained and continuous play
- The relatively high speed of EGM operations
- The appearance of regular 'near misses'
- Accessibility to EGMs in local areas
- Unique lighting and sound effects associated with EGM operation
- Relative asociality of EGM gambling
- Misunderstanding or irrational beliefs about the probability of winning or the likely pattern of events
- Relatively low apparent entry price for participation in the activity of EGM gambling
- Tokenisation of money for the purposes of EGM use
- Possibility of misrecognising familiarity with EGM operation as an element of skill
- Familiarity of EGM games including themed games using popular TV or film characters

(see, for example: Griffiths, 1999b, Popkin, 1994, Blasczcynski *et al* 2001, Turner & Horbay, 2004, Parke & Griffiths, 2004, Marshall 2004, Livingstone 2001 and 2001a, Barrington Centre Pty Ltd, 2002, Blasczcynski, Sharpe & Walker, 2001, Breen, 2004, Delfabbro, Falzon & Ingram, 2004, Ladouceur & Sevigny, 2005).

In addition to the above, research reported in Livingstone (2005) indicates the importance to problem gamblers of EGM 'features' involving the occurrence of a series of free spins when particular symbols appear on the screen. Gamblers report playing in patterns thought to influence the likelihood of achieving these free spins, during which prize values are increased by a factor of two or three.

Areas of research inadequacy and disagreement

There are a number of important gaps in the current understanding of the interface between EGM users and EGMs. Many of these relate to the relative efficacy of harm minimisation measures. It must be noted that harm minimisation measures tend to be derived from particular theoretical views about the impact that particular EGM characteristics may have on those who play them. Thus, it may be theorised that reducing the maximum amount that can be wagered on one spin of the EGM will reduce the level of expenditure and thus reduce harm. However the research conclusions in relation to this apparently straightforward proposition are quite unclear. There are many other examples of this difficulty, which arise

from the lack of reliable data tracking EGM features and relating these to both the experiences of gamblers and the actual performance of EGMs equipped with whatever feature is of interest.

It is also likely that in a number of such cases, industry and or regulators may have access to information or understanding that is not generally published, and because of considerations of commercial confidentiality or similar, such information has not been generally published. It should also be noted that although there is broad agreement in some areas as to the likelihood that particular EGM characteristic will be associated with the onset of problem gambling behaviour, there is frequently considerable disagreement as to the relative importance of this and the level of intensity at which it may affect behaviour. For example, the configuration of bank note acceptors falls into this category.

Key areas in this category include:

- Game design relating to specific name, artwork and sound effects
- Impact of relative speed of machine operation on onset of problem gambling
- Impact of maximum bet limit on onset of problem gambling
- Relationship between game events and expenditure patterns (e.g., frequency of achieving game feature, incidence of small wins)
- Proximity of and withdrawal limits for automatic teller machines
- Configuration of bank note acceptors
- Limits on maximum credit value
- Venue type and design
- Prohibition on smoking
- Relative density of EGMs
- Anonymity of players as compared to card based systems for recording player behaviour

(see for example: Barrington Centre 2002, Livingstone 2005, Blasczcynski, Sharpe & Walker, 2001, Consumer Contact, 2003, Tse, Brown & Adams 2003, Schellinck & Schrans, 2002, Loba, Stewart, Klein & Blackburn, 2001, Dickerson, Haw & Shepherd, 2003, Hing, 2003, Marshall 2005)

Implications for the current research

We note that there are a number of areas where clarification of the specificity of game and machine issues will produce a much improved understanding of the impact of particular EGM/game features or characteristics on problem gambling behaviours. In a number of cases these will be clarified by focused discussions with EGM users (particularly self-assessed problem gamblers) in order to identify what if any characteristics are most commonly identified.

In our opinion these will certainly include:

- Importance of game speed
- Importance of game name or appearance
- Importance of machine ‘free spin’ features to player behaviour
- Importance of symbols used in game to enjoyment or continuation of play
- Impact of jackpot availability of decision making, session times and bet levels
- Relationship between length of session and availability of refreshments etc
- Determinants of and decision making in respect to session times

- Accessibility and difficulties of avoiding venues
- Characteristics of venues
- Extent to which lighting and sounds affect player behaviour
- Necessity to obtain change to commence or continue play
- Prevalence of 'irrational' beliefs
- Self perceptions of apparent causality (including self assessment of co-extensive problematic issues) for excessive or problem gambling behaviour

In other cases data for games and venues may identify 'high performing' games and venues and direct observation of gambling activity may identify what if any characteristics appear to be related to such performance. For example, the importance of maximum bet levels to player consumption appears high as does the increasing complexity of games, including availability of games within games and single platform multi-jackpot machines, etc.

We also note the importance of adopting a multi-faceted approach to explanation of gambling behaviours. Although various theoretical approaches may have good face validity and appear to explain substantial aspects of problem or other gambling behaviour, there is no single theoretical approach which can currently account for all gambling behaviour, or even most such behaviour, in relation to all the circumstances in which EGM gambling is currently available. For this reason, the researchers believe that the insights of gamblers (particularly problem gamblers) will almost certainly provide challenges to all theoretical perspectives and should be placed at the core of explanation and discussion in respect of the research focus. This consideration has been recognised in different ways by such diverse researchers as Blaszczynski (2000) and Zangeneh and Haydon (2004).

Appendix D Telephone survey script

*7687 AIPC/MONASH UNI GAMBLERS STUDY

DISK
Q99STRT

*testver

"PHONE:_[Q0PH]_

Previously contacted[Q0DAT2] [Q0TIM2]

[Q0HIS] [Q0DAT] [Q0TIM]

[Q0COM]

ATTEMPT: [Q0CAL]"

"Good afternoon/evening, my name is [Q0IV] from Harrison Health Research. We are conducting research about certain recreational pursuits on behalf of Monash and La Trobe Universities and would value your household's input.

Screen 1 Does anyone in your household work in the hotels or clubs industry? _IF YES, THANK & TERMINATE. IF NO: CONTINUE._

Please may I speak with the person in the household aged 18 or over who was last to have their birthday? _RE-INTRODUCE AS NECESSARY_"

PAUSE

"The survey will take about 15 minutes. _IF THEY'RE HESITATING BECAUSE OF TIME_ We do need to get opinions from as wide a cross-section as possible and it would really help if we could speak with you.

IF CONCERNED ABOUT PRIVACY I can assure you that any information you give will remain confidential. Any identifying information is removed before results are analysed and no one's individual answers can be passed on to our clients or anyone else."

START

START

Q1S HOW OFTEN PLAYED EGMS IN LAST 12 MTHS
"Q1S In the last 12 months how often, on average, have you played poker machines? Would that be... _READ OUT 1-8_"

1. Daily
2. 6 times per week
3. 4-5 times per week
5. 2-3 times per week
6. About once a week
7. At least once a fortnight but less often than weekly
8. Less often or never

FAIL "Thank you for your time, unfortunately you do not qualify for this study."
IF 8 IN Q1S ABORT "DOES NOT QUALIFY"

Q1 HOW MANY MONTHS OR YEARS PLAYED POKIES
"Q1 How many months or years have you been playing the pokies?"
1. Years (specify Q101)
2. Months (specify Q102)

GO Q2A

Q101 YEARS PLAYED POKIES
Q102 MONTHS PLAYED POKIES

Q2A HOW MUCH TIME SPENT PLAYING POKIES ON AVG
"Q2A When you go to a gaming venue how much time (on average) do you spend playing poker machines?"
1. Hours (specify Q2A01)
2. Minutes (specify Q2A02)

GO Q2B

Q2A01 HOURS SPENT PLAYING POKIES
Q2A02 MINUTES SPENT PLAYING POKIES

Q2B HOW MUCH TIME SPENT ON OTHER ACTIVITIES ON AVG
"Q2B When you go to a gaming venue how much time (on average) do you spend on all other activities, for example conversation, having a meal, listening to music, drinking with friends at the bar, etc?"
1. Hours (specify Q2B01)
2. Minutes (specify Q2B02)

GO Q3

Q2B01 HOURS SPENT ON OTHER ACTIVITIES
Q2B02 MINUTES SPENT ON OTHER ACTIVITIES

Q3 HOW MUCH MONEY SPENT ON AVG IN LAST 12 MTHS PLAYING POKER MACHINES
"Q3 Thinking over the last 12 months, how much money, on average, would you spend each time you play poker machines?"
1. $1-$20
2. $21-$50
3. $51-$100

4. $101-$150
5. $151-$200
6. $201-$250
7. $251-$300
8. $301-$400
9. $401-$500
10. $501-$750
11. $751-$1,000
12. More than $1,000

Q4G PERCENT TIME SPENT ON DIFFERENT DENOMINATIONS GRID
"Q4G What percentage of time do you spend playing various denominations of poker machines, for example 1 cent machines versus 2 cents, $1, etc. _RECORD ZERO IF THEY DON'T PLAY A TYPE OF MACHINE, CHECK SUMS TO 100%_"
MR
1. One-cent machines
2. Two-cent machines
3. Five-cent machines
4. Ten-cent machines
5. Twenty-cent machines
6. $1 machines

FOR EACH

Q4 PERCENT TIME SPENT ON DIFFERENT DENOMINATIONS
"Q4 What percent of time do you spend playing..."
EACH
"[Q4G....][Q4..]"
edit
"
TOTAL [Q4T...T100]"
BLANK
WIDTH=3
1. NUM 0-100
2. NUM 0-100
3. NUM 0-100

GO Q5
Q4T TOTAL

Q5 NAME OF FAVOURITE MACHINE
"Q5 What is the name of your favourite poker machine?"
MR
1. Adonis
2. Black Rhino
3. Choy Sun Doa
4. Dolphin Treasure
5. Geisha
6. Indian Dreaming
7. Mega Bucks

8. Queen of the Nile
9. Shogun or Shogun 2
10. Treasure Chest
11. Other (specify Q501)
---
12. Don't have a favourite machine
13. Can't recall its name

GO Q6

Q501 OTHER FAVOURITE MACHINE

Q6 BETTING STYLE
"Q6 Thinking about the size of your bets and how many lines you gamble, what is your usual betting style when gambling on poker machines? For example, minimum bet-one line, maximum bet-multiple lines, etc. _PROBE TO CLARIFY MINIMUM VERSUS MAXIMUM BET AND ONE LINE VERSUS MULTIPLE OR MAXIMUM LINES_"
1. Minimum bet - one line
2. Minimum bet - multiple lines (but less than the maximum)
3. Minimum bet - maximum lines
4. Medium bet - one line
5. Medium bet - multiple lines
6. Medium bet - maximum lines
7. Maximum bet - one line
8. Maximum bet - multiple lines (but less than the maximum)
9. Maximum bet - maximum lines
10. Don't have a style / it varies
11. Don't know

Q7 INCREASE SIZE OF BET
"Q7 Do you increase the size of your bet.... _READ OUT 1-5_?"
MR
1. When you haven't had a payout for a while
2. When thinking of winning free games with better odds
3. When thinking of the game feature
4. To increase the size of any wins
5. To trigger a win
6. Never increase size of bet

Q8 DECREASE SIZE OF BET
"Q8 Do you decrease the size of your bet..._READ OUT 1-3_?"
MR
1. After a payout
2. If you won free games not long ago
3. If you had the game feature not long ago
4. Never decrease size of bet

Q9 GAMBLING SESSION DESCRIPTION
"Q9 Which one of the following statements best describes your typical gambling session? _READ OUT 1-5_"
1. I always spend all the money I have available

2. I often spend all the money I have available
3. I leave the venue before all my money is gone
4. I often take out my winnings and leave
5. I always take out my winnings and leave
6. It varies regularly

Q10G GRID FEATURES ATTRACTIVE TO GAMBLERS
"Q10G Poker machines have a range of features that make them attractive to gamblers. Please rate how attractive or unattractive you find the following features, based on your own experiences."
1. Reel symbols
2. Multiple line betting
3. Music & sound
4. Frequent payouts
5. Colour, lights & graphics
6. Free spins or free games
7. Special feature within game, the game features
8. Music & lights accompanying wins
9. Theme or character of the game
10. Big payouts

FOR EACH

Q10 FEATURES ATTRACTIVE TO GAMBLERS
"Q10 How attractive do you find _[Q10G]_ Would you say..._READ OUT 1-4_?"
1. Unattractive
2. Not very attractive
3. Attractive
4. Very attractive
5. Undecided

Q11G GRID STATEMENTS
"Q11G On the scale of 1-5 where 1 is strongly disagree and 5 is strongly agree, please indicate whether you agree or disagree with the following statements?"
1. Skilful play will make gaming machines pay out more frequently
2. Machines will pay out if you keep playing them
3. It is possible to trigger a win by increasing the size of your bet or the number of lines played
4. Some machines pay out more than others

FOR EACH

Q11 STATEMENTS
"Q11 Do you agree or disagree that _[Q11G]_ on a scale of 1-5 where 1 is strongly disagree and 5 is strongly agree?"
NUM 1-5

Q1F HOW OFTEN BET MORE THAN COULD REALLY AFFORD TO LOSE
"QF1 In the last 12 months, how often have you bet more than you could really afford to lose on poker machines? Would you say never, rarely, sometimes, often or always?"
1. Never

2. Rarely
3. Sometimes
4. Often
5. Always
6. Don't know/ can't remember
7. Refused

Q1FDUM CPGI SCORE BET MORE THAN COULD AFFORD TO LOSE
IF 1 OR 6 OR 7 IN Q1F
=0
IF 2 OR 3 IN Q1F
=1
IF 4 IN Q1F
=2
IF 5 IN Q1F
=3

Q2F HOW OFTEN NEEDED TO GAMBLE WITH LARGER AMOUNTS OF MONEY TO GET SAME FEELING
"QF2 In the last 12 months, how often have you needed to gamble with larger amounts of money to get the same feeling of excitement? Would you say never, rarely, sometimes, often or always?"
SEE Q1F

Q2FDUM CPGI SCORE NEEDED TO GAMBLE LARGER AMOUNTS FOR SAME FEELING
IF 1 OR 6 OR 7 IN Q2F
=0
IF 2 OR 3 IN Q2F
=1
IF 4 IN Q2F
=2
IF 5 IN Q2F
=3

Q3F HOW OFTEN GONE BACK ANOTHER DAY TO WIN BACK MONEY LOST IN PREV SESSION
"QF3 In the last 12 months, how often have you gone back another day to try to win back the money you lost? Would you say never, rarely, sometimes, often or always?"
SEE Q1F

Q3FDUM CPGI SCORE GONE BACK ANOTHER DAY TO WIN BACK MONEY LOST IN PREV SESSION
IF 1 OR 6 OR 7 IN Q3F
=0
IF 2 OR 3 IN Q3F
=1
IF 4 IN Q3F
=2
IF 5 IN Q3F

=3

Q4F HOW OFTEN BORROWED MONEY/SOLD ANYTHING TO GET MONEY TO GAMBLE
"QF4 In the last 12 months, how often have you borrowed money or sold anything to get money to gamble? Would you say never, rarely, sometimes, often or always?"
SEE Q1F

Q4FDUM CPGI SCORE BORROWED MONEY/SOLD ANYTHING TO GET GAMBLING MONEY
IF 1 OR 6 OR 7 IN Q4F
=0
IF 2 OR 3 IN Q4F
=1
IF 4 IN Q4F
=2
IF 5 IN Q4F
=3

Q5F HOW OFTEN FELT MIGHT HAVE A PROBLEM WITH GAMBLING
"QF5 In the last 12 months, how often have you felt that you might have a problem with gambling? Would you say never, rarely, sometimes, often or always?"
SEE Q1F

Q5FDUM CPGI SCORE HOW OFTEN FELT YOU MIGHT HAVE A PROBLEM WITH GAMBLING
IF 1 OR 6 OR 7 IN Q5F
=0
IF 2 OR 3 IN Q5F
=1
IF 4 IN Q5F
=2
IF 5 IN Q5F
=3

Q6F HOW OFTEN HAS GAMBLING CAUSED ANY HEALTH PROBLEMS
"QF6 In the last 12 months, how often have you felt that gambling has caused you any health problems, including stress or anxiety? Would you say never, rarely, sometimes, often or always?"
SEE Q1F

Q6FDUM CPGI SCORE GAMBLING CAUSED ANY HEALTH PROBLEMS
IF 1 OR 6 OR 7 IN Q6F
=0
IF 2 OR 3 IN Q6F
=1
IF 4 IN Q6F
=2
IF 5 IN Q6F

=3

Q7F HOW OFTEN HAVE PPL CRITICSED YR BETTING/TOLD YOU HAD A GAMBLING PROBLEM
"QF7 In the last 12 months, how often have people criticised your betting or told you that you have a gambling problem, whether or not you thought it is true? Would you say never, rarely, sometimes, often or always?"
SEE Q1F

Q7FDUM CPGI SCORE PPL CRITICISED YOUR BETTING/TOLD YOU HAD A GAMBLING PROBLEM
IF 1 OR 6 OR 7 IN Q7F
=0
IF 2 OR 3 IN Q7F
=1
IF 4 IN Q7F
=2
IF 5 IN Q7F
=3

Q8F HOW OFTEN HAS GAMBLING CAUSED FINANCIAL PROBLEMS FOR YOU OR HOUSEHOLD
"QF8 In the last 12 months, how often have you felt your gambling has caused any financial problems for you or your household? Would you say never, rarely, sometimes, often or always?"
SEE Q1F

Q8FDUM CPGI SCORE GAMBLING CAUSED ANY FINANCIAL PROBLEMS FOR SELF OR HOUSEHOLD
IF 1 OR 6 OR 7 IN Q8F
=0
IF 2 OR 3 IN Q8F
=1
IF 4 IN Q8F
=2
IF 5 IN Q8F
=3

Q9F HOW OFTEN FELT GUILTY ABOUT WAY GAMBLE OR WHAT HAPPENS WHEN GAMBLE
"QF9 In the last 12 months, how often have you felt guilty about the way you gamble or what happens when you gamble? Would you say never, rarely, sometimes, often or always?"
SEE Q1F

Q9FDUM CPGI SCORE FELT GUILTY ABOUT WAY GAMBLE OR WHAT HAPPENS WHEN GAMBLE
IF 1 OR 6 OR 7 IN Q9F
=0
IF 2 OR 3 IN Q9F
=1
IF 4 IN Q9F

=2
IF 5 IN Q9F
=3

Q999CPGI CPGI SCORE
=Q1FDUM+Q2FDUM+Q3FDUM+Q4FDUM+Q5FDUM+Q6FDUM+Q7FDUM+Q8FDUM
+Q9FDUM

Q12 GENDER
"Q12 _RECORD GENDER_"
1. Male
2. Female

Q13 WHAT YEAR WERE YOU BORN
"Q13 What year were you born?"
NUM 1900-1989

Q14 WORK STATUS
"Q14 Which of the following best describes your current work status? _READ OUT 1-6_"
1. Work full-time
2. Work part-time
3. Home duties
4. Student
5. Unemployed
6. Retired/ age pension
7. Other

Q15 COUNTRY OF BIRTH
"Q15 In which country were you born?"
split=1
1. Australia
2. Austria
3. Bosnia-Herzegovina
4. Canada
5. China
6. Croatia
7. France
8. Germany
9. Greece
10. Holland / Netherlands
11. Hong Kong
12. Iran
13. Italy
14. Japan
15. Malaysia
16. New Zealand
17. Philippines
18. Poland
19. Slovenia
20. Spain
21. UK and Ireland

22. USA
23. Vietnam
24. Former Yugoslav Republic of Macedonia
25. Former Yugoslav Republics of Serbia & Montenegro
26. Other country (specify Q1501)
27. Refused

GO Q16

Q1501 OTHER COB

Q16 POSTCODE
"Q16 What is the postcode of your usual address?"
NUM 5000-5999

IF NOT 5999 IN Q16 GO Q18

Q17 TOWN OR SUBURB
"Q17 What is your suburb, town or community?"
1. Enter town/suburb (specify Q1701)

GO Q18

Q1701 SUBURB

Q18 INCOME
"Q18 Finally, I would like to ask you about your income. Before tax is taken out, which of the following ranges best describes your personal, annual, gross income? _READ OUT 1-6_"
1. Less than $25,000
2. $25,000 to less than $50,000
3. $50,000 to less than $75,000
4. $75,000 to less than $100,000
5. $100,000 to less than $150,000
6. $150,000 and over
7. Refused

Q19 CLOSE
"Q19 That concludes the survey. On behalf of Harrison Research and Monash and La Trobe Universities, thank you very much for taking part in this survey."
BLANK

Q0QUO

TOTAL=180

1. 180 TOTAL
2. 31 PROBLEM GAMBLERS

USE 1 IF 1 IN Q0LOC
USE 2 IF 3-27 IN Q999CPGI

Appendix E Logistic regression analysis, EGM performance, South Australia & Victoria

Analysis of variables:

Correlation table between variables

VIC	*$ real consumption*	*Time*	*Adult Population*	*EGMs*
$ real consumption	1			
Time	0.837680	1		
Adult Population	0.771934	0.993374	1	
EGMs	0.958837	0.779044	0.703896	1

SA	*$ real consumption*	*Time*	*Adult Population*	*EGMs*
$ real consumption	1			
Time	0.960923	1		
Adult Population	0.939408	0.997255	1	
EGMs	0.933414	0.838857	0.798235	1

The "time" variable will be taken as a proxy for the population and this represents the increase in expenditure due to the natural increase in population (and possibly income)

The number of EGM is also in the model to capture the NGR per machine

The model:

A multiple regression model was analysed of the form

$$y_t = \beta_1 x_{1t} + \beta_2 x_{2t} + e_t \text{ for South Australia}$$

and

$$y_t = \beta_1 x_{1t} + \beta_2 x_{2t} + \beta_3 x_{3t} + \beta_4 x_{4t} + e_t \text{ for Victoria}$$

where

y_t is the real consumption in millions of $

x_{1t} is the time

x_{2t} is the number of EGMs

x_{3t} is an interaction dummy equal to D^*x_{1t} for the time set at year 2002-03 when the smoking ban was introduced

x_{4t} is an interaction dummy equal to D^*x_{2t} for the EGMs set at year 2002-03

For Victoria, we analysed two models, one for the years before the smoking ban and another for the following four years, with the coefficients β_3 and β_4 representing the difference between the two models.

Before $y_t = \beta_1 x_{1t} + \beta_2 x_{2t} + e_t$

After $y_t = (\beta_1 + \beta_3) x_{1t} + (\beta_2 + \beta_4) x_{2t} + e_t$

The Data:

VIC Year	Real consumption in Million $	Log Consumption	Time	EGMs	EGM dummy	Time Dummy
1992-93	359.462	5.885	1	13,661	0	0
1993-94	947.168	6.853	2	14,421	0	0

1994-95	1265.674	7.143	3	19,069	0	0
1995-96	1604.006	7.380	4	23,420	0	0
1996-97	1869.678	7.534	5	25,694	0	0
1997-98	2129.128	7.663	6	26,813	0	0
1998-99	2465.610	7.810	7	27,249	0	0
1999-2000	2653.889	7.884	8	27,325	0	0
2000-01	2728.523	7.912	9	27,164	0	0
2001-02	2873.861	7.963	10	27,361	0	0
2002-03	2549.056	7.843	11	27,261	27,261	11
2003-04	2441.233	7.800	12	27,138	27,138	12
2004-05	2488.172	7.819	13	27,124	27,124	13
2005-06	2472.452	7.813	14	27,147	27,147	14

SA Year	Real consumption in Million $	Time	EGMs
1994-95	248.297	1	7,374
1995-96	411.218	2	9,262
1996-97	467.592	3	10,451
1997-98	503.234	4	10,898
1998-99	558.238	5	11,944
1999-2000	594.199	6	12,738
2000-01	626.737	7	14,096
2001-02	680.461	8	14,647
2002-03	730.632	9	14,841
2003-04	771.079	10	14,799
2004-05	779.040	11	14,062
2005-06	751.032	12	12,598

Regression Output:

SUMMARY OUTPUT _VIC

Regression Statistics

Multiple R	0.999742
R Square	0.999484
Adjusted R Square	0.888201
Standard Error	61.83779
Observations	13

ANOVA	*df*	*SS*	*MS*	*F*	*Significance F*
Regression	4	66653954	16663489	4357.707	2.21E-13
Residual	9	34415.21	3823.912		
Total	13	66688369			

	Coefficients	*Standard Error*	*t Stat*	***P-value***	*Lower 95%*	*Upper 95%*
Time	**193.6564**	11.73119	16.50782	**4.9E-08**	167.1186	220.1942
EGMs	**0.036987**	0.003107	11.90489	**8.24E-07**	0.029959	0.044015
EGM dummy	**0.061535**	0.012946	4.753191	**0.00104**	0.032249	0.09082
Time Dummy	**-208.762**	29.62741	-7.04624	**6.01E-05**	-275.784	-141.74

Data from 93-94 until 05-06

SUMMARY OUTPUT SA

Regression Statistics	
Multiple R	0.999204
R Square	0.998409
Adjusted R Square	0.898249
Standard Error	26.82749
Observations	12

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	4515307	2257653	3136.875	1.59E-13
Residual	10	7197.143	719.7143		
Total	12	4522504			

	Coefficients	*Standard Error*	*t Stat*	***P-value***	*Lower 95%*	*Upper 95%*
Time	**24.60177**	3.097498	7.942465	**1.25E-05**	17.70011	31.50342
EGMs	**0.035136**	0.00182	19.30192	**3.04E-09**	0.03108	0.039192

Data from 94-95 until 05-06

Interpretation:

Victoria:
Prior to the introduction of the smoking ban, the average increase in EGM consumption per year was $193 million. After the introduction of the smoking ban (the last 4 years of the series), EGM consumption decreased on average by (193.65-208.76) $15 million per annum.

Before the smoking ban, on average, each additional machine added (0.037) $37,000 to the yearly consumption. While after the smoking ban, each additional machine contributes on average (0.036987 + 0.061535) $98,000 to the yearly consumption.

South Australia:
The average yearly increase is expected to be $24 millions and the contribution of each machine is $35,000 on average.

While the number of machines has decreased in the last year, we cannot analyse the effect of this change without additional data, probably for at least two more years.

Appendix F Calculation of gambler sessions

Note: these tables are calculated using average session times for problem gamblers of 110 minutes and for non-problem gamblers of 60 minutes. The division of time between games of different credit value has been simplified to include only the most popularly utilised combinations, and we have undertaken these calculations for Shogun 2 games and Indian Dreaming games only. The volatility of EGM games, the distribution of their payouts, and the consequent tendency for actual outcomes to be skewed in favour of much higher average NGR per session is not accounted for in these tables, which set out theoretical average amounts staked and NGR.

Table F1: Calculation of average time spent and number of spins completed using specific credit value EGM games by gambler status and utilisation rate

					N spins at:					
			Time spent (minutes)		12 Spins/minute		10 spins/minute		6 spins/minute	
Credit value	PGs	Non-PGs	PGs	Non-PGs	PGs	Non-PGs	PGs	Non-PGs	PGs	Non-PGs
1c	81.5%	83.1%	90	50	1,076	598	897	499	538	299
2c	9.4%	3.9%	10	2	124	28	103	23	62	14
5c	1.6%	4.8%	2	3	21	35	18	29	11	17
$1	4.7%	6.3%	5	4	62	45	52	38	31	23
TOTALS	97.2%	98.1%	107	59	1,283	706	1,069	589	642	353

Table F2: Calculation of value of theoretical average total amount staked during session by gambler status, credit value and utilisation rate – Indian Dreaming and Shogun 2 games

			$ staked					
			12 Spins/minute		10 spins/minute		6 spins/minute	
Average bet	Game	Credit value	PGs	Non-PGs	PGs	Non-PGs	PGs	Non-PGs
$0.50	Indian Dreaming	1c	$537.90	$299.16	$448.25	$249.30	$268.95	$149.58
$0.79		2c	$98.02	$22.18	$81.69	$18.49	$49.01	$11.09
$3.04	Shogun 2	$1	$188.60	$137.89	$157.17	$114.91	$94.30	$68.95

Table F3: Calculation of theoretical average NGR during session by gambler status, credit value and utilisation rate – Indian Dreaming and Shogun 2 games

				$ theoretical NGR					
				12 Spins/minute		10 spins/minute		6 spins/minute	
Average bet	Average RTP	Game	Credit value	PGs	Non-PGs	PGs	Non-PGs	PGs	Non-PGs
$0.50	89.80%	Indian Dreaming	1c	$54.87	$30.51	$45.72	$25.43	$27.43	$15.26
$0.79	89.54%		2c	$10.25	$2.32	$8.54	$1.93	$5.13	$1.16
$3.04	92.75%	Shogun 2	$1	$13.67	$10.00	$11.39	$8.33	$6.84	$5.00
		TOTALS		$78.79	$42.83	$65.66	$35.69	$39.40	$21.42

Table F4: Calculation of proportional theoretical NGR and time per session by gambler status, game and credit value – Indian Dreaming and Shogun 2 games

Game	Credit Value	PGs - $	PG – time	Non-PGs - $	Non-PGs - time
Indian Dreaming	1c	69.6%	81.5%	71.2%	83.1%
	2c	13.0%	9.4%	5.4%	3.9%
Shogun 2	$1	17.4%	4.7%	23.3%	6.3%

Data source – all tables in this Appendix – telephone survey and OLGC

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