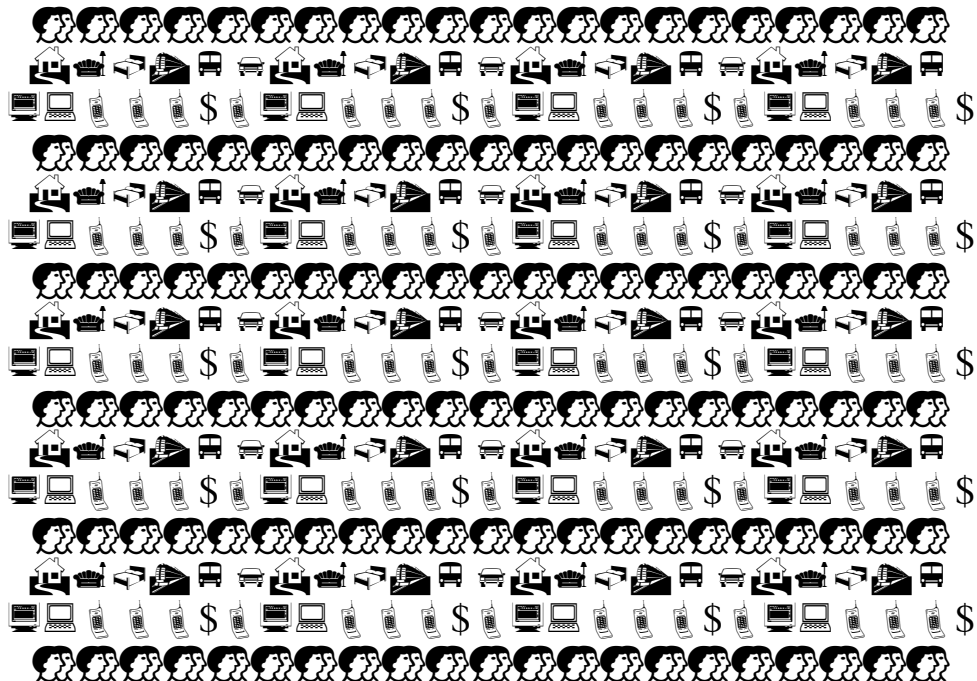Gambling and the Impact of New and Emerging Technologies and
Associated Products
Tender No 119/06

Final Report - August 2010

J.G. Phillips
Monash University

Prof. Alex Blaszczynski
University of Sydney

Executive Summary

Overview

- This project was commissioned by the Victorian Department of Justice (Tender No 119/06) in association with Gambling Research Australia. It was a collaborative effort between Dr. James G. Phillips (Monash University) and Prof. Alex Blaszczynski (University of Sydney).

- The aims of the project were to: **(1)** review literature for evidence relevant to the uptake of technology for games and commercial applications, and the regulation thereof; **(2)** Use survey methodologies to assess the uptake and use of technology for recreational purposes within Australia and specifically to consider whether individuals who are "at risk" of developing gambling problems also report problems controlling their internet, mobile phone, radio and television use. **(3)** Use experimental paradigms within a laboratory setting to examine the effects of computer mediation on wagering behaviour and to consider the potential of decisional support to reduce harm.

Contents of the Report

- The first sections of the report address relevant research regarding gambling online and associated technologies capabilities and issues *(Section 1)*. This section is divided into the stages of a communication process required for online gambling to occur. It begins by addressing the **Access to a Proposition** *(Section 2)* where: information and communication technology is used to transmit a message from the promoter to the consumer indicating that gambling is available online. Next, we consider the **Stake** *(Section 3)* where consumers use information and communication technology to register their wagers with the gambling provider. Once this has occurred, the **Outcome** *(Section 4)* of any gamble is determined and is communicated to the consumer either by the provider or a third party. Following this, **Resolution** *(Section 5)* occurs where messages are sent indicating that accounts have been adjusted either positively or negatively as a function of the outcome. Finally, the literature review deals with issues related to **Dispute** *(Section 6).* In the event of problems further

messages may be sent to discuss probity and deception.   Helping behaviour on the internet, and technologies for assistance are discussed in this section. **Conclusions** from the literature review are provided in *Section 7*.

- The rationale and introduction to the survey are provided in *Section 8*, with the sample demographics provided in *Section 9*. Results of the Survey are provided in Sections 10-15, with *Section 10* focusing on Interactive Television, Radio, Internet, Landline and Mobile Phone use and the relationship of each of these to wagering. *Section 11* discusses the use of each of these technologies and their interplay with Gambling, which leads into results from the factor analysis in *Section 12*, which examined factors that influenced recreational technology use. *Section 13* considered issues within the survey data relevant to dispute, participants concerns regarding spam and online security, their potential for complaint and access to organisations for assistance. *Section 14* Examines differences in the use of interactive services and gambling as a function of age, and *Section 15* provides a summary of the survey data and conclusions.

- Two experimental studies are considered in this report, with introductions, detailed methodologies, results and discussions of each study provided in *Section 16*. Overall conclusions for this report are provided in *Section 17*, with a glossary of terms *(Section 18)* and the questions used in the online survey *(Section 19)* provided.

Online Gambling

- Traditional (offline) forms of gambling such as Casino games and Electronic Gambling Machines (EGM) placed in gaming venues have been controlled in Australia by licensing operators and by governments limiting the numbers of EGMs or licences for table games.

- The converging capabilities of computers, mobile phones, interactive television, set top boxes and games platforms potentially allows online gambling to be available on any of these devices and to be accessed by consumers any time of day from anywhere in the world. This increased availability could lead to increases in gambling-related problems; however research on the relationship between availability and problem gambling suggest that potential increases in problem gambling could be mitigated if appropriate controls are put in place.

Access to Online Gambling

- In the current environment, online gambling is only partially regulated and thus poses a higher risk for consumers compared to offline gambling. Despite this, the internet potentially allows consumers to side-step any existing controls and access gambling from unregulated environments using web enabled devices.

- This is a potential concern, as the internet is an environment where deception is prevalent and people are less likely to assist others with problems. Nevertheless the Australian Psychological Society has kept abreast of technological advances and a variety of online therapies are also available to assist consumers.

- Relationships between availability of products such as *alcohol* and the problems caused are considered because of their ability to cause harm. Alcohol-related problems are linked to availability, and government attempts to control harm have sought to limit availability, yet research suggests that this strategy may be less effective for those at most risk or alcohol-related problems.

- While there may be relationships between availability and *problem gambling*, they appear to have been mitigated by community controls such as limits of EGMs in local pubs and clubs. However, technology has the potential to increase the accessibility of gaming within the community setting.

- Attempts to control these online gambling opportunities may benefit from targeting organisations that host gaming sites, or to restrict the movement of funds, or where regulated, monitor consumers and offer warnings and advice on appropriate devices (e.g. mobile phones and the internet).

The Stake – Gambling Online

- It is important to consider differences between populations sampled "online" and "offline". Issues when recruiting an online sample include who has access to the technology (sample demographic of interest) and how widespread is it use (what proportion of the population use the technology). In addition, characteristics of 'online' samples are important given that early research into technological use has suggested psychological differences, with people who were more withdrawn likely to have higher rates of technology use.

- Differences in data collection 'online' verses 'offline' is important in terms of identifying problem gamblers, those who are attracted to particular technologies and also dealing with participants. Ethical issues including the preservation of privacy, informed consent, deception, de-briefing and research methodology all need to be considered when defining a population of interest for study purposes.

- The stake also evokes the question of whether online wagering behaviour can be influenced using online messaging. Socio-cognitive accounts have suggested that gambling involves a decision making process and ongoing research has sought to influence the gambler's decision making process by supplying decisional support.

- One limitation with increased availability of online gambling is restricting access to particular sections of the community (e.g. minors). Filters may be used to block access to gambling technology or sites, but they are unlikely to be 100% successful. In addition, biometrics alone will not suffice to block underage gambling. A combination of these approaches may be more efficacious. If consumers gamble electronically, there is the potential for them to be tracked and either offered inducements, or given electronic warnings to minimise harm.

- While new technology provides increased opportunities to gamble, there is also the potential for inducements or warnings to target specific individuals (using biometrics) at specific locations (near gaming venues) and times (e.g. during play).

The Outcome

- The provider of gaming may supply information to the gambler as to the result of outcomes, or third parties may be involved where sporting events are under consideration.

- Where the provider of gaming supplies information as to the result of outcomes, the amount and quality of information may be at issue. There are limitations upon the amount of information that can be transmitted on the internet, mobile phone etc. These limitations mean there is a potential loss of fidelity when conveying outcomes of events in real time. This has meant that the internet was better suited to games involving static outcomes such as sporting events and lotto wagering. These limitations have the potential to be offset with the increase in access to broadband, and the move towards digital as opposed to analogue technology.

- Interactivity (and potentially gambling) can be achieved using a number of technologies including PCs (through the internet), via television (through the telephone network e.g. *Foxtel*) or through games consoles and other devices (e.g. *TiVo*) that can access the internet, or by using mobile devices such as mobile phones (e.g. via the internet or using premium SMS).

Resolution

- After the outcome of the gamble is known, a consumer either loses their stake, or is returned the initial stake and gains some additional amount. This involves the transfer of money electronically. Important areas within this transfer include 'trust' of on-line sources, and the protection of privacy for consumers.

- A variety of organisations are attempting to deliver services electronically, including organisations that would be involved in resolution of transactions and any dispute associated with on-line gambling. Online interactions can reduce costs and can potentially speed up transactions. The uptake and use of these electronic services requires a degree of consumer trust.

- The *Interactive Gambling Act 2001* makes it an offence to provide interactive gambling services such as roulette, poker, craps and online poker machines or indeed even advertise them to customers in Australia.

- Despite the provisions of the Act, off-shore interactive gambling is advertised in Australia and while it may be an offence to offer such services, it is not an offence to utilise them, with the result Australians are claimed to spend more than an estimated $300 million annually on online poker.

- Most online gambling sites require users to first deposit money into a betting account before they can commence gambling in the form of e-cash. Money can be transferred to the betting account from, for example, an existing bank account or debited directly to a credit card such as those supplied by a credit card.

Dispute

- Potential for dispute arises when there is non-compliance with the social contract by either the provider or the consumer of gambling product.
- Given that some forms of online gambling may use information and communication

technology to exploit legal loopholes, there may be grounds to support losers' disputes. There is plenty of historical literature associated with the concern as to the honesty and probity of providers of gaming products and there are now a number of websites providing blacklists and claims of dishonest operators.

- There are standards for consumer service over the internet. For instance the governing body of the World Wide Web (W3C) provides guidelines for the usability and compatibility of platforms and devices (http://www.w3c.org.au/). Hence, some technical devices such as mobile phones which have small screens, compound problems related to usability and provide area where there is potential for dispute.

- There is a greater likelihood for people to engage in deceptive practice over the internet using text based communication. Unfortunately the heightened potential for deception appears to be associated with a concomitant reduced tendency for people to be helpful over the internet, and this means gambling using information and communication technology potentially puts the consumer at greater risk.

- Where a consumer is distressed, help is more likely to be forthcoming from named professionals than anonymous individuals (e.g. discussion groups). Hence there will be a need for specific dedicated forms of assistance for problems associated with online forms of gaming; however research into online counselling is only in its infancy.

The consumer leisure questionnaire

- To address technology use for recreational purposes, an Australia-wide survey was conducted. There were 1012 "complete" questionnaires at close of data collection (viz 5 pm 1st December 2008 AEST). Scales were developed to measure whether people had problems controlling their use of specific technologies (i.e. TV, radio, internet, landline and mobile phones). The scales had good reliabilities (i.e. 0.804, 0.824, 0.860, 0.867, 0.900 respectively), and correlated with self-reported levels of use of the specific technology (i.e. 0.286, 0.472, 0.485, 0.465, 0.442 respectively). Other scales were developed to assess interest in access to digital services and concern for electronic privacy.

- Data from the survey indicated that emergent technologies will serve as tools that provide access to the object of interest. For example, gamblers were specifically

interested in gambling rather than other forms of entertainment. Gamblers seem to be interested in technologies to the extent that they can supply information relevant to gambling activities.

- There were some activities where an interest in a technology has the potential to exacerbate a gambling problem. For instance, prize shows, home shopping, voting on reality TV shows and SMS calculation services all appear to attract the interest of people who have problems controlling their technology use and problem gamblers.

- These applications may serve as pathways that can direct people with an interest in a specific technology into gambling. Indeed, an increased use of a technology seemed to be associated with increased risk. For instance, a greater use of electronic services was associated with increased levels of Spam, and problem gamblers in particular reported receiving more Spam. Hence there are already indicators of higher risk and potential for dispute associated with emerging technologies.

- The data indicated that for electronic services the community typically expects the provider or the industry to resolve any dispute, but 66% of the community did not know which bodies were appropriate to contact given a dispute. In the event of a gambling problem however, the community currently *expects the problem to be addressed by counsellors*, and this may be an issue during a crisis when the consumer is no longer located in the gaming venue, but is rather at some location that is remote from the provider of gaming products and services.

- There are community concerns that online gambling will be accessed by younger (and underage) groups. There are relationships between age and technology use, but it is primarily interest in technology rather than age that predicts the use of online interactive services. Indeed, whilst younger age may predict the use of internet for sports betting, older age may predict the use of premium SMS services.

- To better understand the factors influencing recreational technology use, a factor analysis was conducted on the survey data. Four factors could explain the use of interactive services. One factor seemed to be a tendency to respond impulsively, and this predicted the use of interactive services. A second factor appeared to be that of an interest in gambling. A third factor appeared to be a preoccupation with technology to entertain. A fourth factor seemed to be an interest in competitions. These factors were to some extent correlated. The Gambling factor correlated more with the factor addressing Impulsive Interactivity rather with the factor addressing preoccupation

with technology for the purposes of entertainment.

Experimental Studies

- Technological advancements in computers now enable web capable devices to support online gambling applications. There is thus a need to understand variables associated with the computer *mediation* of gambling experiences, such as the separation of gambling outcomes in space or time from the consumer, and the greater potential for decisional support afforded by computers.

Experiment 1

- To examine the effects of computer mediation upon wagering behaviour, an experiment was conducted to consider the effects of computer mediation upon wagering patterns, time to place bets and utilisation of a decision aid. Twenty four participants, played a simulation of roulette either collocated with the dealer, via a live video-link or via a pre-recorded outcome. Participants tended to be more confident of winning in the collocated version of roulette. Significant interactions were found between Location and Decisional Support for the level of risk taken by participants, with an increase in the riskiness of wagers placed in the prerecorded condition, and a decrease in the riskiness of wagers placed in the videolinked condition.

- When a decision aid in the form of previous numbers were supplied, participants tended to be faster placing bets and took more time registering the first number in their call bets, particularly for the prerecorded condition.

- Finally, participants reported a significant preference for gambling in the collocated condition (*n*=21) over the videolinked (*n*=1) and videorecorded (*n*=2) conditions, suggesting that gambling in the presence of the actual outcome is preferred over computer-mediated forms.

- The results from Experiment 1 suggest that computer mediation is able to influence wagering behaviour in terms of the amounts the bet, the time taken to place these bets and the level of risk. As these effects interact with the decisional support, it is likely that they are linked to the operation of erroneous cognitions and illusions of control.

Experiment 2

- Experiment 2 considered the potential for decisional support to reduce potential harm. Decision-aids can be used to inform, but may also influence, decision-making. The second experiment aimed to determine whether a decision-aid which provided biased/directional information was capable of influencing decision-making toward a specific alternative. The effects of time pressure and risk on decision-making and decision-aid utilisation were also investigated.

- Twenty-four participants played computerised blackjack with directional information provided. The results supported the hypothesis that biased information would influence decision-making toward the suggested alternative. Increased time pressure, as hypothesised, led to a greater number of errors. Player compliance with the advice supplied by the decision aid increased with viewing time. Wagering behaviour could be influenced by on screen messaging, but effects may vary with perceived risk. Future research should investigate various factors such as decision-aid transparency and individuals' perceptions of the utility of decision-aids.

Conclusions of Experimental Studies

- Computer mediation of wagering poses potential risks to consumers. The experimental studies demonstrated how consumers can be separated in time or space from gambling outcomes. In these laboratory simulations, computer mediation was not preferred by potential consumers, and was perceived to convey a degree of risk. In addition, the potential decisional support afforded by the computer might also influence consumer behaviour. Warnings are likely to influence potential consumer behaviour, but their impact may vary as a function of perceived risk.

1. Literature Review – Computer-Mediated Communication and Gambling

The capability to conduct financial transactions using information and communication technology has existed since the advent of the telegraph, but ongoing developments mean that there is now potentially the capability to conduct financial transactions on almost any electronic device that has computing power and connectivity (see Jenkins, 2006; http://en.wikipedia.org/wiki/Technological_convergence). This literature review outlines some issues and challenges posed by the use of information communication technology to support gambling. Specifically, it addresses the use of the internet, mobile phone technology, and interactive TV to communicate and support the delivery of gaming to remote locations. Specific emphasis is given to relevant technical and psychological factors influencing the use of these gaming technologies. The psychological theory developed in this literature review is intended to address factors influencing consumer uptake of such gaming endeavours and indicate the potential markets for these forms of gaming with a consideration of possible controls and methods of minimising harm. As will be outlined, there are individual differences in preferences for virtual interactions, and there are indications that people respond to virtual interactions differently to face-to-face interactions.

1.1 Information and Gaming

Information and communication technology allow the transmission of information over distance. Where this information relates to financial details, commercial transactions are possible. If the promoter of these financial transactions promises the consumer dramatic returns (e.g. +100%) for their investment on what are essentially trivial or chance events, then these transactions could be considered gambling. For gaming to occur on communication channels a number of messages need to be transmitted (see Toneguzzo, 1997). Figure 1.1 illustrates the series of messages that need to be transmitted using information and communication technology to allow the conduct of online gaming. For gaming to occur, there needs to be the transmission between two parties of messages concerning a proposition; a stake; an outcome; and its resolution. A proposition is made by the promoter; a stake is hazarded by the consumer; the outcome is revealed by the promoter (or a third party), and the promoter then resolves the gaming activity by making adjustments to the hazarded amount on the basis of the outcome and the initial proposition. Where dispute occurs, further communication may occur.

Proposition. Essentially the promoter of financial transaction puts to the consumer a proposition, namely that considerable gain can be obtained on the outcome of a chance event or a competition involving low levels of skill.

Stake. The consumer of the financial transaction hazards an amount of money upon the outcome of the proposed chance event or low skill competition.

Outcome. The promoter of the financial transaction (or a third party) conveys to the consumer the outcome of the proposed chance event or low skill competition.

Resolution. Based upon the outcome the consumer either loses the initial stake, or is returned the initial stake and gains some additional amount.

Dispute. Gaming essentially is the enactment of a contract, where both the proposer and the staker undertake to uphold their part of the contract. Where there is concern as to the fidelity of either party to the contract, or the outcome, dispute may occur. Dispute may be addressed by way of self-regulation, or by referring to an external regulatory body.

In 2008 this literature review was conducted using PSYCINFO (with supplementary searches using Google), focussing upon specific research and evidence relevant to the impact of emerging technology on the conduct of online gambling and its regulation. In 2010 the sections on tracking and counselling were updated.

The following chapters will examine factors associated with the information transfers associated with each stage in the online gaming process. Each section will finish with a discussion of methods of controlling a specific element of the online gaming process.

Figure 1.1. The process of electronic messaging required to support online gambling.
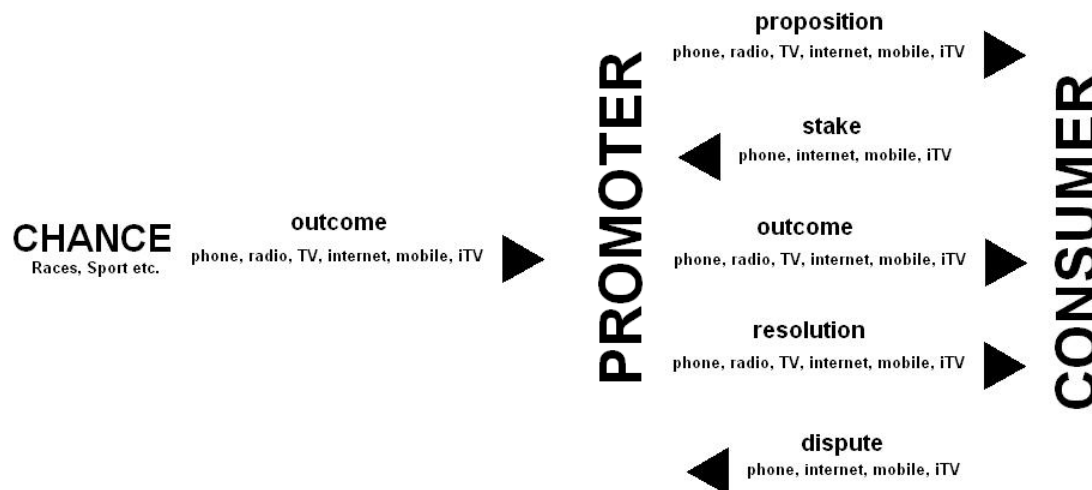
1.2 References

Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York: New York University Press.

Toneguzzo, S. (1997). Internet gaming - Evidence for parliament of South Australia, Social Development Committee. In G. Coman & B. Evans (Eds.), *Responsible gambling: A future winner* (pp. 369-389). Proceedings of the 8th National Association for Gambling Studies conference, Melbourne, 27-29th November 1997.

2. Access to the Proposition

A number of issues have been raised within the context of the legalisation of gambling. Eadington (1996) discussed three arguments: 1) gambling as immoral and inconsistent with values of work, reward and social justice; 2) gambling as linked to organised crime and corruption; 3) gambling as leading to compulsive gambling and social costs.

1) **Morality**. Eadington (1996) observed that there has been a considerable latent demand for gambling, and that this is an activity that is generally accepted within communities. For instance the majority of Australians engage in gambling of some form indicating that this activity is generally accepted by the community where available. Eadington (1998) likens gambling to the consumption of alcohol. Governments can either allow adults the right to consume such products, or can engage in paternalistic protection. Even though people of higher socioeconomic status can afford to gamble and lose, people of lower socioeconomic status cannot (Eadington, 1998). Nevertheless, the suggestion that gambling be reserved for people of higher economic status is inconsistent with democratic process (Eadington, 1998). Gambling can be viewed as an adult form of play (see Neal, 2005), but Eadington (1998) also argued that when gambling is promoted as a source of wealth, potential consumers may need to be protected.

2) **Crime.** Eadington (1996) pointed out that legalised and regulated gambling cuts down on crime. A regulated industry does not engage in criminal activity or it risks its' licence, and regulation actually protects the consumer. When casino gambling was first legalised in Australia the higher incidence of Asian gambling was perceived to be a problem. Elders from these communities reported that gambling had been occurring secretly within their communities, but that with the legalisation of gambling, this gambling was "unmasked" as people could now gamble openly.

3) **Social costs**. Whereas the majority of individuals gamble, and do so without ill effects, Eadington (1996) acknowledged that a minority of individuals gamble to excess. Problem gamblers admittedly make a greater contribution to the gaming industry, but it can be argued that this is a voluntary contribution. The Productivity Commission (1999) viewed gambling as a form of entertainment, and reported a net benefit to the community associated with legalised gambling. Note however that others argue that gambling creates more economic costs than benefits (Grinols, 2001).

Proponents of further expansion of legalised gambling sometimes argue that legalisation will lead to economic growth (Walker, 1999). Economic growth has been linked to certain specific locations and jurisdictions such as Nevada and Tunica County but not others such as Atlantic City (Walker, 1999). Economists argue that in jurisdictions where economic development occurred, benefits from the legalisation of gambling arose because gambling was drawing money from other sources (Walker, 1999), and as such could be regarded as an "export". For instance, the early casinos tended to draw money from other jurisdictions. As legalised gambling becomes more pervasive (Eadington, 1996) an argument for further legalisation may be to prevent monies going elsewhere. For instance when gambling is already legal in a neighbouring jurisdiction, the legalisation of gambling can be seen as a form of "import substitution" (Walker, 1999). In such a case the legalisation of gambling prevents the money going to the other jurisdiction. In Australia the Productivity

Commission (1999) implied in comparison with other forms of entertainment (e.g. cinema) that more of the money associated with gambling stayed in the country.

The complexities of online gambling make it difficult for legislators to limit its growth (Watson, Liddell, Moore, & Eshee, 2004). At present the market continues to be dominated by unknown companies situated in countries with little or no control over their operations (Eadington, 2004), while more reputable "brand names" tend to be prevented from operating. Some authors argue that it will be impossible to control online gaming (Parke & Griffiths, 2004; Watson, Liddell, Moore, & Eshee, 2004), and argue that legalising and regulating this product will benefit consumers and of course "prevent the money from going elsewhere" (Owens, 2006).

The arguments raised by economists can be applied to the emerging capability of computing devices to deliver gambling over the internet, mobile phones and interactive televisions. In the case of internet gambling it can be argued that internet casinos were acting as an "export", drawing money from elsewhere (Eadington, 2004). For instance *Lasseter's* online could have been said to "export" gambling to other jurisdictions. However the present legal use of the internet for sports betting and lotto in Australia may be replacing a face-to-face mode with another mode of transaction, for instance as cars replaced horses as transport. However it is difficult to make similar claims for mobile gaming and interactive television.

A legalisation of casino-style gambling on mobile phones and interactive television could be argued to be making gaming more available, without conferring an economic benefit. Instead of bringing money from other jurisdictions, and stimulating the economy these forms of gambling would be competing with and drawing money away from other applications (Eadington, 1995; Grinols, 2001). As such it could be argued that there would be no economic benefit from a legalisation of these forms of gambling.

Nevertheless, these arguments assume a finite amount of money (a zero sum game) such that if person A wins, person B loses. Some economists argue that such an assumption may not be appropriate because economies are not zero sum games (Walker, 1999). Economies grow, as infrastructure is developed and real estate appreciates (Walker, 1999). One of the arguments for the adoption of eCommerce is that the power of the internet can be used to speed up transactions and reduce costs (Nielsen, 2000).

Eadington (1998) argued that further proliferation of gaming and a greater pervasiveness of gaming outside casinos reduces operating costs such that higher economic rents can be charged, but at the same time increases competition to operators. However, the greater availability to the consumer outside of controlled venues also makes gambling harder to control (Eadington, 1998). Eadington (1996) argued that legalisation would assure quality control and confer a degree of consumer protection.

Electronic gaming machines are argued to be the most dangerous form of gambling (Dowling, Smith, & Thomas, 2005), and jurisdictions have sought to restrict access and control the numbers of these devices (Eadington, 1995). One of the more recent arguments for the legalisation of gambling is that prohibition is futile (Eadington, 2004; Parke & Griffiths, 2004; Owens, 2006; Watson, Liddell, Moore, & Eshee, 2004). Anyone with a device that is web enabled can potentially access gambling products from internet casinos. For instance, *Spin3* has announced that their casino games are now compatible with Blackberry mobile phones (http://www.casinotoplists.com/blackberry-high-quality-mobile-

gambling). As such casino style gambling may soon be possible on any computing device, interactive television (http://www.budde.com.au/Research/Digital-Media-Broadcasting-Digital-TV-HDTV-Interactive-TV-STB.html) and mobile phone (see http://www.mobiles.com.au/fun-with-mobiles/mobile-gambling/), and this potentially poses a serious social problem. In response to this alarmist position, some have argued that legalisation will confer a degree of consumer protection and quality control (Eadington, 1996; Owens, 1996). Nevertheless, there is a need to properly evaluate the risks posed by these devices.

2.1 Access to technology capable of supporting gambling

Prior to the mid-1900s people wanting to gamble were restricted to doing so at discrete times and in discrete places with the venues dictating the forms of gambling available, namely casinos offering poker, roulette and slot machines and racetracks offering horse or dog racing. However, this situation changed with the coming of the digital age and the development of technology and communications platforms. Information and communication technology allows gaming providers to overcome limitations of time and space, allowing the real-time transmission and reception of information anywhere in the world, at any time. Gamblers can potentially access any form of gambling electronically at any time and from anywhere, using devices capable of accessing the internet such as desktop and portable computers, internet-enabled mobile devices such as phones and Personal Digital Assistants (PDAs), large-screen digital TVs and games consoles. The factors that allow such a potentially pervasive and ubiquitous gaming environment involve the availability of: 1) a suitably fast network providing internet access; and 2) a device capable of accessing that internet. In order to gauge the proportion of the Australian population that could potentially participate in electronic gambling then it is necessary to look at both internet and device capability/availability.

2.1.1 Internet capability/availability

The internet can be accessed through a number of technologies including dial-up through the copper wire network, wireless and cable. The difference between technologies primarily relates to the speed at which data can be transmitted. The more data to be transmitted the faster the internet speed needs to be to achieve an acceptable user experience. Video and audio streaming of a live event in real time (e.g. a horse race) involves large amounts of data and hence requires a very fast "broadband" technology such as Asymmetrical Digital Subscriber Line (ADSL), cable or satellite.

Definitions of exactly how fast an internet connection needs to be in order to qualify as "broadband" varies from country to country and changes as technology advances. In 2003 for example, the International Telecommunication Union's Standardisation Sector defined broadband as a "transmission capacity that is faster than….1.5 or 2.0 Mbits/s)" (ITU, 2003) whereas in 2009 the United States Federal Communications Commission defined "broadband" at the much slower rate of "…transmission speeds exceeding 200 kilobits per second (Kbps)" (US-FCC, 2009).

The Australian Communications and Media Authority (ACMA) classifies "broadband" as including Hybrid Fibre Coaxial (HFC) cable, ADSL, Wireless and Satellite technologies. Table 2.1 shows, amongst other things, the reported service coverage of each of those technologies as at 30 June 2008 (from ACMA, 2008).

Table 2.1. Broadband coverage in Australia as at 30 June 2008

Broadband Technology	Coverage	Download speed	Providers
HFC cable	2.6 million premises	8 mbps to 30 mbps	4 carriers with metropolitan and regional centre networks
ADSL	91% of population	256 kbps to 24 mbps	19 carriers with active DSLAM installations
Wireless	Selected metropolitan and regional areas	512 kbps to 3.6 mbps	225 service providers
Satellite	100% of population	256 kbps to 24 mbps	48 service providers

The table indicates all Australians currently have access to broadband internet through, at a minimum, relatively slow satellite technology. However, that situation is set to improve in future since the announcement by the Federal Government in April 2009 that it would commit some $4.7 billion towards an optical fibre-based National Broadband Network capable of delivering speeds of 100 megabits/sec to 90% of the population. The remainder, those living in remote parts of the country, will be able to access the network through next generation wireless and satellite technologies at speeds of 12 megabits/sec. The National Broadband Network will purportedly ensure "Every person and business in Australia, no-matter where they are located, will have access to affordable, fast broadband at their fingertips" (Media Release, 2009).

Although all Australians already have access to some form of broadband internet, not all have made use of that access, with ACMA reporting only 7.2 million internet subscribers at June 2008 with 78 per cent of them subscribing to a broadband service (ACMA, 2008). This is no doubt partially attributable to the fact that not all households have access to a computer. The Australian Bureau of Statistics reports that in 2007-08 only 75% of households had a computer (Australian Bureau of Statistics, 2008a). However with the Federal Government aiming to ensure every Year 9 to Year 12 student (15 to 18 years old) will have their own computer by 2011 through its Digital Education Revolution (Dept of Education, Employment and Workplace Relations, 2008), the number of households without access to a computer can be expected to decrease in future.

2.1.2 Mobile Internet
While all Australians have access to some form of broadband internet and many have the capability to use that access, not all have such access from mobile devices such as mobile phones or PDAs.

Advances in technology have seen increased capabilities in mobile communications platforms. "First generation" communications platforms for example involved analogue technology and gave rise to the mobile analog network used in Australia until 2000. "Second generation" (2G) communications involved digital technology and resulted in, amongst other advances, a Global System for Mobile (GSM) communications and the ability to transmit low

volume digital data such as SMS. Telecommunications carriers are currently providing "Third generation" (3G) platforms capable of providing users access to the internet. Such platforms generally use Wideband Code Division Multiple Access (W-CDMA) technology to deliver download speeds of up to 14.4Mbit/s and so are capable of quickly and efficiently delivering both voice and data to mobile users (ACMA, 2009). Australia currently uses 2G (GSM) and 3G (W-CDMA) mobile phone technologies.

Table 2.2 shows the percentage of the Australian population able to access GSM or 3G technologies from a mobile device as at 30 June 2008 (from ACMA, 2008). Currently only 1.2% of Australians are unable to access the mobile 3G network, and hence the internet, from their mobile phone/device. Of the 98.8% of the population that are capable of such access, *the number actually having a phone able to provide that access is unknown* however some rough estimates can be inferred.

Table 2.2. Percentage of population able to access GSM or 3G technologies from a mobile device as at 30 June 2008

Technology	% of population	No. of Carrier Networks
2G (GSM)	96%	3
3G (W-CDMA)	98.8%	3

In order for internet sites to be correctly displayed on the small screens and relatively poor computational power of mobile phones, the Wireless Application Protocol (WAP) was developed. WAP is an international standard specifically designed to allow handheld, mobile devices such as mobile phones and Personal Digital Assistants access to certain internet sites. Those sites use text and graphics specifically created for the small screens/limited computing power of such devices to ensure the dimensions of the site are such that it displays correctly on those devices. WAP was first launched in Australia in 1991 by *Optus* (Optus, 1991).

The most recent Telecommunications Performance Report by ACMA stated annual mobile handset sales to be 7.7 million (ACMA, 2005). The total Australian population in 2007 was reported to be 21.01 million (Australian Bureau of Statistics, 2008b) suggesting Australians upgrade their mobile phones roughly every three years.

If the first WAP enabled mobile phones became available in 1991 and Australians purchase a new mobile phone every three years on average, then theoretically all mobile phones currently in use should be able to access the mobile 3G network. But there may be other issues. For instance users may not know how to use this capability on their phones.

Other estimates of mobile internet access can be derived from small scale surveys. In 2008, 547 Monash University students were asked whether they had web-enabled mobile phones. Responses were obtained from 264 students, giving a response rate of 48.3%. It was found that 68.1% of individuals reported having web-enabled mobile phones (Phillips, Jory, Wijenayake, & Hii, 2010).

2.1.3 *Availability of hardware to support online gaming*
All Australians potentially have access to some form of broadband internet from their homes however some 25% of households do not have a computer and so are unable to achieve access. Government initiatives aimed at ensuring all Year 9 to Year 12 students have

their own computer by 2011 coupled with infrastructure programs such as the National Broadband Network will no doubt result in more Australians having faster internet access in the future.

Although all Australians currently have access to some form of broadband internet from their homes, not all Australians have such access from their mobile devices. Some 1.2% of the population do not presently have access to the 3G mobile network. A proportion of Australians may not have the necessary web-enabled phones to access the internet. From our estimates, 68.1% of the community could be potentially be placing bets on *Tab Mobi* and accessing internet casinos using their mobile phones. The proportion of web capable phones should only continue to increase.

Currently then, through the internet all Australians have available to them the means to engage in electronic gambling with most also possessing devices able to provide internet access (e.g. computers, mobile phones). Should they wish then, the vast majority of Australians can electronically access any form of gambling at any time and from anywhere with the user experience expected to improve as technology advances.

2.1.4 Other means of Internet access
The ability to access the internet is not, however, restricted solely to computers and mobile phones. Although computers and mobile phones are by far the most popular mechanisms for accessing the internet two other methods are also available, interactive Television (iTV) and games consoles. Although less user-friendly, access can also be gained through devices such as subscription television set-top boxes and games consoles (e.g. *Sony's PlayStation 3*).

2.1.4.1 iTV
Conventional (i.e. non-interactive) TV is structured along a one-way transmission model with information flowing from a centre (i.e. TV station) to the audience. Interactive TV (iTV) on the other hand is structured along a two-way transmission model allowing information flow both to and from the audience. Information from the user is transmitted to the centre through a "return path" usually incorporated in dedicated technology such as a set-top box. That return path can involve the internet. (**Note:** the term "set-top box" as used here refers only to those boxes associated with subscription television services (STV) and not to the digital terrestrial tuner set-top boxes required to receive digital television since most digital terrestrial tuner set-top boxes currently do not have the facility for a return path).

Subscription TV is able to be delivered by a number of technologies including multipoint microwave distribution systems (MDS); broadcast direct by satellite to the home (DSS or DTH) and broadband cable communications systems (CTV or Cable). Multi-channel satellite/MDS subscription television, the most prominent of the subscription services, was first launched in January 1995 with cable services made available later that same year (http://www.astra.org.au/article.asp?section=2&option=1&content=1). The potential market size for pay TV in Australia then is 100% of the Australian population (Oztam, 2009).

The three major local providers of pay TV services in Australia are *Foxtel*, *Optus TV* and *Austar*. *Foxtel* and *Optus TV* operate in the metropolitan market while *Austar* operates in the regional market. PayTV services make provision for casino style gameplaying. Despite such a large potential market, growth in the pay TV arena in Australia has been slow.

Although launched in 1995, the three operators have a total of only 2.16 million subscribers, representing a national household penetration rate of about 27 per cent (Peters, 2008) at the end of 2007 with that figure predicted to reach 32% by 2010 (Budde, 2009).

2.1.4.2 Games Consoles

Both *Sony's PlayStation 3* and *Microsoft's* new *Xbox360* can be used to access the internet. The *Xbox360* however does not have a web-browser so there is currently no ability for customers to access web-sites on their TV using that device. Internet access through that device is restricted to a "walled garden" approach that only allows users to participate in on-line, multiplayer games or to download/purchase *Microsoft*-related products.

Other games consoles such as the *PlayStation 3* or the *Nintendo Wii*, on the other hand do have a web-browser and so can be used to access any website the user wishes (http://www.nintendo.com.au/index.php?action=news&cid=14&pageID=6). However as the devices are not full-blown PC they do not have the same capabilities and so have some limitations when compared with a PC. Entering a URL for example involves an on-screen keyboard and is comparatively clumsy and time-consuming relative to an actual keyboard. Further, although users can access any site they may not be able to view the site if it requires plug-ins or the latest version of *Flash* (for example) to display properly since the *PlayStation* is not upgradeable by the user to include plugins/latest version of *Flash*.

The number of *PlayStation 3*'s in Australia can be estimated from reported sales data. Launched in Australia in early 2007, sales were reported to have exceeded 100,000 by November of that year with the expectation that figure would have increased to some 160,000 units by December 2007 (Ramsay, 2007). In 2008 sales of 213,000 units were reported (Richards, 2009). The number of *PlayStation 3's* in Australia then is expected to be in excess of some 373,000. Based on software sales the numbers of Wii are likely to be in excess of 800,000 in 2010 (http://www.kotaku.com.au/2010/01/have-some-more-australian-nintendo-sales-figures/).

2.1.5 Access and potential risk

Any alarm associated with the potential pervasiveness of mobile gaming and interactive TV needs to be viewed within the context of business/media response to technology. In response to the dot.com bubble of the 1990s Gartner (www.gartner.com) proposed that media response to the adoption of specific technologies by business follows a curvilinear relationship with two turning points (a "Hype Cycle") (see Figure 2.1). After the initial development of a technology breakthrough (technology trigger), there is a period of enthusiasm for the potential of a technology associated with a frenzy of publicity (peak of inflated expectations), that is then followed by a period of disappointment (trough of disillusionment) where there is a realisation that the capability of the technology does not match the initial wild expectation such that the media abandons the topic. At the next stage (slope of enlightenment) some businesses may properly explore the practical applications of the technology, and then the technology becomes widely demonstrated and accepted by business (plateau of productivity).

Figure 2.1. Gartner's "Hype cycle"
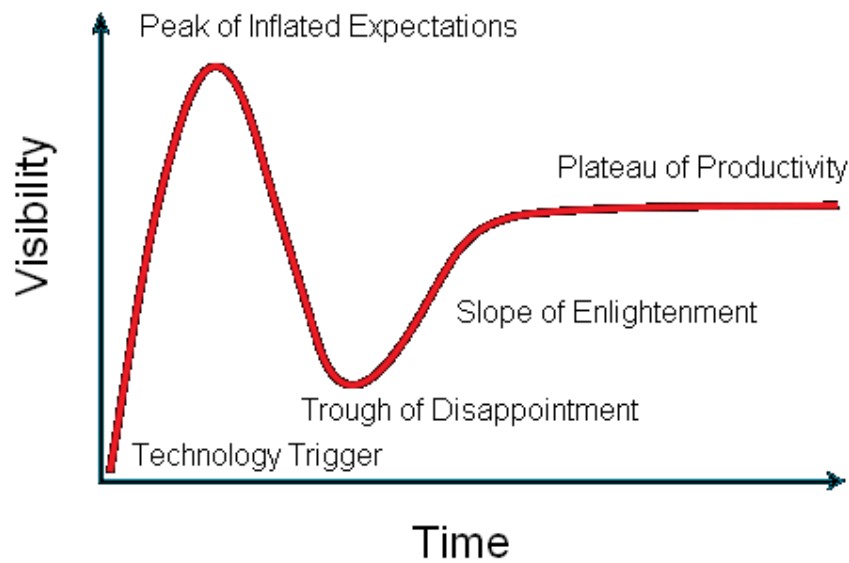
In the case of emerging technologies and gambling, there is the suggestion that every mobile phone or interactive television could become an electronic gaming machine (technology trigger). This has generated potential concern (e.g. http://www.abc.net.au/lateline/content/2007/s2169815.htm;
http://www.theaustralian.news.com.au/story/0,,23588667-30540,00.html;
http://www.tvtonight.com.au/2008/02/victorians-set-to-gamble-through-pay-tv.html).

When considering the case of mobile phones, the small screens of mobile phones (Souza, 2006; Wei, 2008) suggest that they may not be a substitute for other devices such as televisions or dedicated gaming devices. For instance Ivory and Magee (2009) report reduced levels of arousal and involvement with portable screens. Indeed Wei (2008) felt that there would be other limits upon mobile phone use. Wei (2008) argued that mobile phones will be used for entertainment applications, such as viewing television programs and playing games, when people are in transit between workstations and televisions in lounge rooms. As such the mobile phone is liable to be used to play games by approximately 20% of individuals (Phillips, Butt, & Blaszczynski, 2006) for that period that they are in transit using public transport, or occupying queues.

The case of interactive television is a different proposition, and harder to evaluate. At present the concern has been the speed with which digital television has been taken up. There can be a degree of resistance within the computer market to the uptake of new technologies (Tanner, 2006). Conversely, the ready accessibility of this technology could be argued to reduce costs to the consumer (Eadington, 1998). Consumer response to this technology could be difficult to gauge for other reasons. As indicated in DSM-IV, gambling can be a secretive activity which people engage in to escape from other activities or stresses. Hence the degree to which gambling occurs in the lounge room on interactive television may vary as a function of supervision (Rosen, Cheever, & Carrier, 2008; Wang, Bianchi, & Raley, 2005). Currently the potential to gamble interactively on television is limited to subscription TV services and a limited number of games consoles that may be difficult to use.

Given the potential pervasiveness of these devices, it is important to consider the possible effect of increased availability. As parallels have been drawn between the consumption of alcohol and the consumption of gambling (Eadington, 1996; 1998), the effect of availability upon the consumption of alcohol will be now be considered.

2.2 Alcohol and the Availability Hypothesis

As it has been suggested that there is a direct relationship between "availability" and addiction, a consideration of other addictions is useful, most notably alcohol. Whilst alcohol is legally available in many jurisdictions, and generates revenue through taxation for governments, alcohol is known to cause harm, with alcohol-use disorders a major mental and public health issue in Australia (Teesson et al., 2000). A number of studies have considered the relationship between alcohol availability and resultant changes in consumption patterns and alcohol-related harm across distinct communities (Babor et al., 1978; D'Abbs & Tongi, 2000; Smith, 1986; 1988). Alcohol control measures available to governments include: laws to regulate a minimum age of purchase; taxes; licences for retail outlets; penalties for the individual drinker (e.g. drink driving); or penalties for businesses (e.g. for selling to minors). In addition to these measures, other public heath measures can be adopted to reduce alcohol-related harms such as improving highway safety (minimise negative consequences) or limiting alcohol advertising (reducing attractiveness) (Cook & Moore, 2002). Cook and Moore (2002) argued that governments or regulators must weigh up the loss of individual liberty that these measures bring versus the potential community well-being. There is some evidence that these measures either alone or in combination influence alcohol-related harms.

2.2.1 Effects of changing opening hours or trading days

A study by McLaughlin and Harrison-Stewart (1992) considered the effect of extended trading hours upon alcohol consumption. Trading hours were extended in Western Australia (WA) to coincide with the America's cup being held in Fremantle. Trading hours within a 100 kilometer radius of Fremantle were extended. Hotels were permitted to close at 2am instead of midnight from Monday to Saturday. In addition, instead of a half day on Sunday, hotels could trade all day.

McLaughlin and Harrison-Stewart (1992) compared young males in Fremantle (designated as the experimental area) and Mt Lawley (designated as the control area) before and after extended trading hours. Male residents (18-28 years old) in this study were interviewed in their homes as to their drinking patterns over the course of a week, one month before and six months after the implementation of extended trading hours in Fremantle and were compared to the control area (Mt Lawley). No statistically significant increases in the mean alcohol consumption were found after the 6 month extended trading hours. One month prior to extended trading hours the mean weekly total alcohol consumption was 170.7g (SD= 196.0) for Fremantle and 162.4g (SD = 163.2) for Mt Lawley residents, and following extended trading hours the mean weekly total alcohol consumption was 165.8g (SD= 175.8) for Fremantle and 160.3g (SD = 164.3) for Mt Lawley residents. However there was considerable variability in the reported amounts of alcohol drunk.

Inspections of McLaughlin and Harrison-Stewart's (1992) means suggested that alcohol consumption in Fremantle *increased* during extended trading hours on Sunday (mean increase 5.1 gms) and Monday (mean increase 9.8 gms), but *decreased* on Wednesday (5.4 gms) Thursday (mean decrease 5.1 gms).and Friday (mean decrease 5.0 gms). Participants in

Fremantle reported spending more on alcohol during the extended trading hours, and there were correlations between reported amounts consumed and time spent in hotels (for both groups). The authors felt this was evidence that heavy drinkers made use of the extended trading hours and consumed higher levels of alcohol. The authors also commented that only a minority of people reported frequenting the licensed venues during the extended trading hours, but those who did had higher levels of alcohol consumption for the week. The authors suggested that the extended trading hours may lead to increases in alcohol problems for this particular group.

However, McLaughlin and Harrison-Stewart's (1992) study has been criticised because people with no fixed address were excluded even though they have potentially higher rates of alcohol use. Furthermore, the design of the study had been questioned by Chikritzhs et al. (1997) because the large influx of visitors for the sporting event made it difficult to make any meaningful comparisons about the alcohol consumption habits of people living in these two areas. Furthermore, Chikritzhs et al. (1997) noted that limiting alcohol availability may be difficult for a number of reasons that may be conflicting. For example, the majority of Australians enjoy access to alcohol; the manufacturing industry wishes to have as few restrictions on it as possible, and retailers want to choose hours that suit them, and governments want to collect taxes, but there are concerns from welfare groups, as residents have a right to enjoy a safe neighbourhood, and there are concerns for public safety. Despite this, when it comes to alcohol availability, regulators are inclined to alter opening hours and or days in preference to the use of any other control measure, yet there has been little scientific study done of the effects of increased or decreased hours (Smith, 1986). Such issues are also of interest in the gambling field, especially when viewed in light of potential increases in the accessibility of gambling technology, through mobile phones, the internet and interactive TV.

One study by Smith (1986) compared men drinking in hotels with early opening hours (6am – 7am) to men drinking in hotels with standard opening hours (10am) in Western Australia. The participants for the study were not significantly different on any demographic variable (marital status, education, occupation, place of residence, on the dole, income, engaging in shift-work). It was found that men in the early-opening group (n=72) drank significantly greater amounts of alcohol, spent longer drinking per week and had a higher number of drinking sessions per week compared to the control group (n=87). They were also more likely when compared to controls to have a second drinking session on a given day, and to consume more alcohol during this time. In addition, Smith found that the early drinkers had significantly higher scores on an alcohol screening instrument (SMAST) and approximately 50% using this instrument were classed as problem drinkers, versus 37% in the control group. In addition to being classed as problem drinkers, Smith (1986) also considered the relative amount of alcohol being consumed by individuals. It was found that 53% of the early opening group compared with 41% of controls drank more than 80gms alcohol per day, a level that is regarded as unsafe.

Norstrom and Skog (2005) looked at changes in consumption associated with extended trading days. They studied the implementation of Saturday alcohol trading in Sweden during 2 phases. Phase I was a control period where only certain areas were allowed to trade, and Phase II represented trading through the whole country. The authors measured alcohol sales and some alcohol harm related measures including number of reported assaults and drunk-driving levels. They found significant increases in alcohol sales during phase I (3.7%) and in phase II (3.6%) and an increase in drink driving (12% during phase I only).

There were no significant differences relating to assaults. The authors suggested that increased availability leads to increased consumption only and that increases in drunk driving were due to increased police scrutiny around the areas allowed to trade on a Saturday during the control period.

2.2.2 Effects on alcohol-related problems

Smart and Mann (1987) examined the relationships across time (1963-1975) between alcohol consumption and several problems related to alcohol use such as hospitalisation for alcohol dependence, death rates for alcohol dependence, chronic liver disease or cirrhosis due to alcohol, alcohol poisoning and drink driving data. They found that while the problem data paralleled the consumption data, when consumption rose, morbidity and mortality did by higher levels compared to consumption. When consumption measures stabilised the mortality and morbidity indictors declined. This may be due to a number of factors. For instance, only historical aggregate data were used and any inaccuracies or non-reported events would not have been included in the analysis. In addition, because of the large time period included, it may also be that patterns of consumption changed due to the influence of a third variable such as an aging population or an increased effort on governments and heath services to promote healthy drinking and living.

Northridge, McMurray and Lawson (1986) compared data for the periods 1971 and 1976, versus 1977 and 1982 for cases of alcohol self-poisoning admissions to a hospital in Scotland after changes in licensing laws that allowed extended evening trading, Sunday trading, and all day licenses. They found a significant increase in hospital admissions following the change in liquor laws. However, this finding is speculative and does not address causation of the increased admissions.

Smith (1988) found that after implementation of Sunday alcohol sales in Brisbane there was an increase in the number of traffic casualties and property damage compared with a control area. However, this has been criticised by Chikritzhs et al. (1997) because while Smith showed an increase in accidents in comparison with a control state on the day of availability, there was an overall increase in total numbers of accidents at all times, making it difficult to rule out that out that people's drinking and driving have been redistributed across the week.

2.2.3 Effects of price

In the gambling literature, electronic gaming machines (EGMs) have been cited as a major contributor to problem gambling (Breen & Zimmerman, 2002; Dowling et al., 2005). EGMs are 'per game' one of the cheaper forms of gambling, with minimum bets of 1c per spin not uncommon. Hence price is another factor that determines access and availability to a particular substance or activity. For example, the effect of restricting sales of alcohol by setting maximal amounts of purchases in one transaction and by taxing some forms of alcohol higher than others has been used in order to control accessibility. A study in rural Australia examined the impact of limiting alcohol availability in five regional and remote towns in NT and WA (D'Abbs & Tongi, 2000). To limit availability, there were restrictions on the sale of cask wine (limited to casks under 4L) and also the maximal take-away per-capita sales. D'Abbs and Togni (2000) found a small decrease in consumption 0 -7% in cask wine after these measures were introduced, however this was partially offset by increases in other types of alcohol sold. The authors also found significant decreases in alcohol-related harm

including property damage, decreases in presentations to hospitals and decreases in criminal charges over varying time periods after the intervention.

Harm is not necessarily directly linked to factors such as alcohol content. Differences between problem behaviours and their association with particular types of alcohol were considered by Stockwell and Crosbie (2001). External factors such as price and product image help to determine patterns of consumption and harm. They note that there is a large difference between the price per standard drink (10g ethanol) and the tax, e.g. between cask wine – 0.34c, 0.07c tax; standard alcohol beer $1.04, 0.29c tax, pre-mixed cans $2.71, 0.71c tax, wine $2.25, 0.47c tax.

Her et al. (1999) conducted a review on deregulation/privatisation of alcohol sales on consumption and problem levels. Their review focused on changes in physical availability (number of outlets to purchase) and economic availability (price). It was found that deregulation resulted in increased hours of sale, more outlets, increased days/week, longer hours and changes in price. Furthermore, in most cases increased availability led to increased consumption e.g. they note that in Iowa and Quebec increased alcohol consumption led to increased price in the short term for popular products and that these price increases counteracted the increased physical availability. Her et al. (1999) also suggest that more work needs to be done in the area to explore the underlying causes of changing consumption patterns.

Manning, Blumberg and Moulton (1995) also considered relationships between alcohol consumption and price, but as the consumption of alcohol varies across the community, they considered how light, moderate or heavy drinkers responded as a function of differences in price. The distribution of alcohol consumption within the community is skewed, with the majority drinking small amounts, while a minority drinking much larger amounts. For instance, Manning, Blumberg, and Moulton (1995) observed that the upper 5% of drinkers consume 36% of alcohol. Hence the distribution of alcohol consumption within the community appears log normal in nature and is sometimes referred to as a Ledermann curve (Ledermann, 1956). Manning, Blumberg and Moulton (1995) were interested in the possible influence of increasing excise upon alcohol consumption. Hence they looked at prices for some standard alcohol purchases (six pack of beer; 750 ml bottle of wine; and 750 ml bottle of whisky) across 232 cities, and considered how relationships between consumption and price varied for different percentiles of alcohol consumption in the community. Their regression analysis considered quantities reported consumed as a function of price, for light, moderate and heavy drinkers. They found that the amounts of alcohol consumed by moderate drinkers appeared to respond to price (namely greater price, less consumed). Nevertheless price had less impact upon light and heavy drinkers. Hence they concluded that increasing taxes would not deter heavy drinking, and would impose a burden upon individuals that were not heavy drinkers, and that were causing fewer problems to the community. Note however that the study used self report, and it is believed that people underreport their alcohol consumption (particularly heavy drinkers).

2.2.4 Effects of advertising controls and business controls
Within the liquor industry, advertising has been constrained in an effort to limit the consumption of alcohol (Agostinelli & Grube, 2002), or to target particular groups (e.g. adolescents, underage drinkers) (Jernigan et al., 2004). Jernigan et al. (2004) considered the amount of exposure that different age groups received through magazines that were read

primarily by 12-20 year olds and 21-34 year olds. They found that advertising to the younger age group, and particularly to underage girls (12-20) of alcohol products increased from 2001-2002, and the authors suggested that while in the past self-regulation by the alcohol industry had been responsible for limiting the amount of advertising seen by underage drinkers, that this mechanism of self-regulation was not sufficient to limit advertising to this age group.

In addition to looking at exposure to alcohol advertising, some research has considered the effects of limiting alcohol advertising on alcohol-related harms. For example, Saffer (1991) looked at the relationship between fatality rates and alcohol advertising and found that after controlling for price and regional socio-economic differences, advertising rather than price was significantly positively related to both total and night time fatalities. This suggests than alcohol advertising plays a role in subsequent alcohol-related harms, however the mechanism of such change is less clear. Whether limiting alcohol advertising itself results in such changes or whether increased knowledge of the effects of alcohol and the potential harms also influences people's behaviour requires more study.

Legalised business complies with laws, regulations and guidelines in order to maintain licenses to serve alcohol and to avoid penalties. Regarding fines for businesses, Cook and Moore (2002) reported that the behaviour of servers of alcohol is partly influenced by management's perception of whether they will be sued. Hence some of the concerns with business relate not only to public health concerns, but also to economic sanctions that may be levelled against any business breaking the rules. For example in the state of Victoria, more than 100,000 license holders, and people who serve alcohol have completed the responsible service of alcohol course since 1992 (Consumer Affairs Victoria, 2008). This course contains information not only about facts about alcohol, but on the laws and responsibilities that are applicable to businesses including their duty of care to patrons and the requirement to not serve alcohol to individuals who are already intoxicated (Consumer Affairs Victoria, 2008).

In another study conducted in Wollongong in Australia (Babor et al., 1978), a number of venues (17) were monitored over an 8-week period for the advertising which they promoted. It was found that only a few included advertising that could be considered positive to public health (e.g. free food, transport), while the majority of the promotions encouraged excessive drinking – breaking both the spirit and letter of the voluntary code – e.g. extended happy hours, drink cards with multiple free drinks, drinks in non-standard measures which encouraged binging, "all you can drink" offers, free drinks all night for women etc. This is important because previous research has identified that both heavy and non-heavy drinkers consume more than twice as much alcohol during simulated happy hours as they did during non-happy hours (Babor et al., 1978).

Another study based in the US around college campuses' found that a 'wet' environment exists around US college campuses where lower sale prices, more promotions and higher rates of alcohol advertising are present and these are correlated with increased rates of binge drinking and the number of drinks consumed by students in the previous month (Kuo et al., 2003). The authors argue that while education on drinking behaviour is important in highlighting the harms of binge drinking, that the marketing strategies used by businesses should also be regulated.

A case study using the UK as an example by Cooke et al. (2004) found that marketing is a powerful took for the alcohol industry to attract young (and underage drinkers. They

noted that the UK has a number of voluntary controls on alcohol advertising, but argued that this is ineffective. For example, the regulations stipulate that alcohol must not be marketed in a publication if more than 25% of its readership is under 18 years. However, they found that popular magazines specifically for youth were filled with alcohol marketing of products aimed at those groups e.g. pre-mixed spirit drinks.

2.2.5 Effects of community measures and physical availability

Community action can also be used in order to limit availability. For example, Reynolds, Holder and Gruenewald (1997) suggested that in addition to limiting availability through price, or the number of physical outlets selling alcohol, it is useful for police or authorities to be involved to ensure compliance with sales and service regulations (e.g. age limits; not serving those already drunk in a bar). However, not all research has demonstrated this as Forster et al. (1995) found that enforcement of laws limiting the sale of alcohol to minors is often minimal, and not a sufficient deterrent for this population to reduce their buying.

A model for alcohol access and resulting problems has been put forward by Reynolds et al. (1997) (see Figure 2.2). This model describes how availability to alcohol influences consumption patterns, and how routine activities when paired with alcohol use can lead to negative outcomes. Note that simply looking at "outlet density" to measure alcohol availability is too simplistic because it depends on where people are buying their alcohol. For example, if you live next to a pub, but never visit it and instead drive to a liquor store to purchase your alcohol then the store is more important for availability purposes, rather than the pub even though it is located closer geographically (Reynolds et al., 1997).

Figure 2.2. Conceptual model for alcohol access (Reynolds et al., 1997).
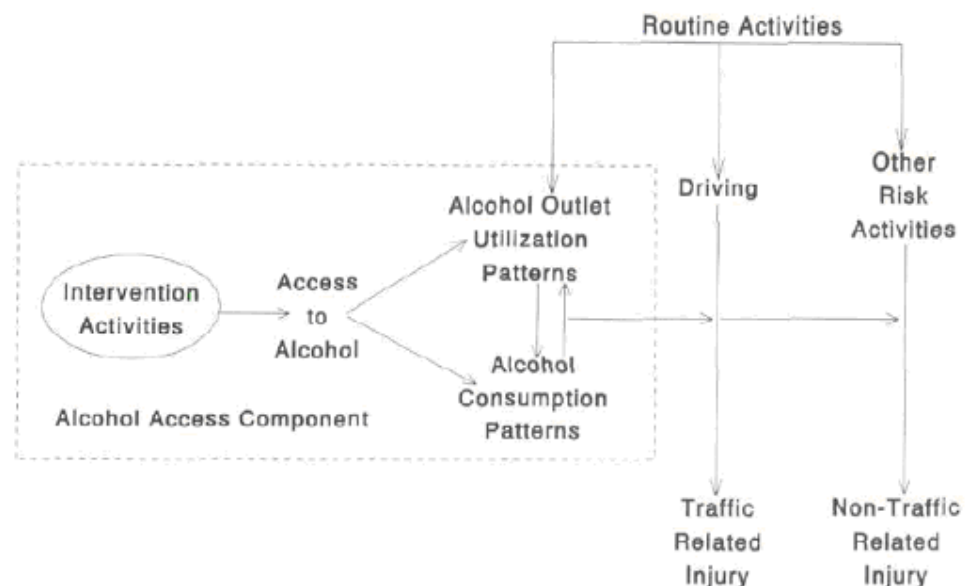
Gruenewald, Madden and Janes (1992) found that the density of outlets selling alcohol was greater in US states where alcohol consumption was high. The authors suggested that when considering locations of alcohol sellers that geographic availability rather than population estimates are more useful because the number of people in an area may be few or many but their access to alcohol can remain the same.

2.2.6 Alcohol purchasability

Forster et al. (1995) highlighted a difference between alcohol availability and that of a related issue, that of alcohol purchasability. For example, in places where the physical availability of alcohol may be low, one business that supplies minors may be enough to supply for the whole local youth population. This means that the purchasability of alcohol for this group is high, even though it may be against the law for them to buy it. Previous research has supported this notion finding that college students know where alcohol is available and know how to increase their chances of a successful purchase (e.g. Wagenaar, Finnegan, Wolfson et al., 1993).

Forster et al. (1995) looked at the purchasability of alcohol without ID from 24 cities in Minnesota and Wisconsin from both on-venue (pubs/clubs/restaurants) and off venue (supermarkets, malls) by females who appeared to be underage (but were not) as rated by a panel of 7 reviewers. They found that the participants were successful approximately 50% of the time in both on and off venue establishments. In analysing the particular venues, location was one factor deemed important in addition to age of the seller, the type of establishment the presence of deterrent signs and presence of others in the queue.

A similar study on purchasability was carried out in Auckland, New Zealand following the reduction in the legal drinking from 21 to 18 years. They found that purchasability was reduced from 60% to 46% after an intervention which involved a media campaign and media releases to newspapers and letters sent to licensees on age checking practices (Huckle et al., 2005).

In addition, it has been suggested that alcohol should be limited only for those people who have a problem with it. For example, Cooke and Moore (2002) note that purchase and consumption of alcohol are highly concentrated and that in the top ten percent of drinking distribution consume more than half of all alcohol consumed. Whilst this may seem to indicate limiting availability to this group, the authors argue that the single distribution theory suggests that alcohol consumption is linked to the population in such a way that in order to decrease the alcohol use of the heaviest users, the entire distribution of drinking must be shifted down. Authors argue that this theory provides a rationale for limiting availability to whole community rather than just the heaviest drinkers.

2.2.7 Summary - Alcohol and availability

The majority of studies have demonstrated that increases in alcohol availability leads to increases in alcohol-related problems. However, limiting alcohol availability may be difficult for a number of competing reasons (Chikritzhs et al., 1997) namely: the majority of Australian's enjoy access to alcohol; the manufacturing industry wishes to have as few restrictions on it as possible, retailers want to choose hours that suit them; and government may want revenue from alcohol sales; while residents have a right to enjoy a safe neighbourhood; and there may be community concern associated with problem drinking.

There is no simple relationship between alcohol availability and increased consumption or alcohol-related problems because communities differ both in their attitudes towards and acceptance of alcohol, and the levels of intervention that governments or regulators are willing to consider. These issues that have been demonstrated to be associated with the control and regulation of alcohol can potentially inform governments as to some of the considerations that need to be taken into account with respect to the regulation of gambling availability. Such considerations are of increasing importance because of the potential increases in electronic gambling devices as a result of the emerging capability of the internet, mobile phone, and interactive TV to support gambling.

2.3 Gambling and the Availability Hypothesis

The idea that greater opportunities for gambling may result in more gambling-related problems has been an area of interest in a number of geographically diverse locations since casinos have opened or changes in gambling policies have occurred (Abbott & Volberg, 1996; Acuri, Lester & Smith, 1985; Cox, 2005; Jacques & Ladoucer, 2006; Lund, 2008; Volberg, 1994). In addition to this, legislators and regulators are faced with requests by the gaming industry to respond to changes in technological capability, especially for devices that allow gambling on new interfaces (e.g. mobile phones and digital TV) (May & Hearn, 2005). For example, it has previously been argued that internet gambling is likely to be a growing and competitive market because computers and high speed internet connections and broadband are relatively cheap, affordable and accessible (Griffiths, 1996; 1999; 2003). This presents government and regulatory bodies with a dilemma, as there are existing community concerns wishing to minimise the harm associated with gambling, and a need to determine whether increasing access through these new interfaces will increase harm. The Productivity Commission in Australia in 1999 stated that the only justifiable reason for limiting accessibility to gambling products was to limit any social harm that results from gambling or to meet other social and community norms.

Jacques et al. (2006) stated that in most industrialised countries there has been increased accessibility to legalised gambling, and increased gambling expenditure. Gambling is a popular activity, with over 80% of adults in the US having gambled in the past year. The wide-spread nature of gambling has led to policies which limit access. For example, in Australia, the availability of EGMs is limited by geographic location to casinos and particular licensed venues and EGMs are also limited by caps on the number of machines allowed within a state or a given venue (Productivity Commission, 1999). While state-wide caps are able to limit the total number of machines that are available to consumers, they may result in increased numbers of EGMs in lower-income areas, or areas where gambling demand is already high (Productivity Commission, 1999). Other mechanisms for limiting accessibility include a cap on the number of machines at a particular venue which may be more useful in controlling accessibility especially for at-risk or problem gamblers, because capped venues are likely to offer other forms of entertainment resulting in less conspicuousness for EGM players (Productivity Commission, 1999).

Researchers have considered the impact that gambling has had upon society, given the relative increase in the number of legalised available forms, using a number of different measures (Abbott, Volberg & Ronnberg, 2004; Rush et al., 2007; Welte et al., 2007). Some research has been correlational in nature and has looked at the relationships between amounts of money spent and the number of Gamblers Anonymous (GA) groups within an area

(Campbell & Lester, 1999). It was found that per-capita spending was associated with the number of GA groups, but that the number of GA groups was not associated with number of electronic gaming machines or the number of group's per capita (Campbell & Lester, 1999). The authors described their results as being congruent with opportunity theory. That is as more opportunities of a given activity are offered, the more people will partake in that activity, and the more people will abuse it (Campbell & Lester, 1999). However, one limitation with this study was that it is correlational in nature, and cannot determine causation and many of the relationships reported were weak ($r = .2$). Despite this, the increased availability of new technologies such as the internet, offers players the chance to gamble at any hour of the day, and any day of the year (Griffiths & Wood, 2000). This raises concerns for regulators because controlling accessibility has been one of the primary methods for regulation and prevention of harm with other addictive substances such as alcohol.

2.3.1 Studying the Availability Hypothesis

Large-scale interviews or surveys in Canada (Cox et al., 2005), New Zealand (Abbott & Volberg, 1996), Norway (Lund, 2008), and Sweden (Abbott, Volberg & Ronnberg, 2004) have been used to study the availability hypothesis. Despite gambling being available and legalised in NZ for decades, the construction of casinos in the late 1980s saw a rise in per-capita expenditure on gambling, doubling from 1988 to 1990 (Abbott & Volberg, 1996). In addition to increased availability of gambling, Abbott and Volberg (1996) noted changes in the public awareness of problem gambling, with a rise in the number of people agreeing that gambling could be a problem for some people (up from 66% to 71%) and that such people should be able to access help services if they wished to give up gambling (from 86%-91%).

In a national survey in New Zealand which included 3,933 adults aged 18 and above, Abbott and Volberg (1996) found that problem gamblers were more likely to regularly participate (once per week or more) in a wider variety of forms of gambling than non-problem gamblers. In addition to this, they also spent more money and displayed a preference for continuous forms of gambling compared to non-problem gamblers.

In Canada, the 1990s saw a spread in the availability of different forms of legalised gambling including casinos and electronic gaming machines (EGMs). Cox et al. (2005) interviewed 34,770 Canadian's aged 15 and over using the CPGI to compare problems across 10 provinces of the country. They found that the highest rates of gambling problems were seen in provinces with highest concentration of EGMs in addition to permanent casinos. Four out of five provinces that had both EGMs and casinos produced the four highest prevalence figures for problem gambling. However, this study only looked at macro-relationships and did not consider the amount of time spent on EGMs or other variables which may lead to at risk behaviour such as the concurrent consumption of alcohol.

Delfabbro (2008) examined the effect of a 15% reduction in the number of EGMs in South Australia. Data were obtained from 594 EGM venues. The removal of around 2000 EGMs in 2005 had very little impact upon levels of EGM expenditure. About 50% of participants reported difficulty gaining access to an EGM and about a quarter felt that this reduced their urge to gamble. Although machines might have been more difficult to find, there was little indication that the frequency, time and effort devoted to gambling decreased. However the absence of effects may reflect the magnitude of the reduction in the number of machines or the one year time frame of the study.

In the US, it has been agued that the legalisation of gambling was due in part to the financial troubles many states were experiencing in the 1970s (Volberg, 1994). Gambling has been introduced in many states in the US in a more staggered fashion beginning with state lotteries, followed by scratchies (1970s), followed by card rooms (1980s), then by the late 1980s, riverboat casinos, EGMs, and Indian Reservation casinos. Volberg (1994) conducted a prevalence study (similar to the Canadian one described above) to look at issues of the availability of different forms of gambling in different states relative to the number of problem pathological gamblers and also the health services offered within each state. Relationships between availability and problem were found. For states with greater access to gambling, there was a greater incidence of problem gambling. Volberg found that eastern states (including Massachusetts and New Jersey) and California had much higher prevalence rates of pathological gambling (2.3%, 1.4% and 1.2% respectively) compared with Iowa (0.1%). Volberg (1994) argued that this difference in prevalence rates was a function of both availability and time. That is, legalised gambling was more common in the states with a higher prevalence of problem gamblers and legalised gambling had been available for over 20 years in these states, compared with less than 10 years for Iowa.

Increases in the availability of gambling have occurred in much of the western world including North America, Europe, New Zealand and Australia. Despite a longer history of gambling in Australia (O'Hara, 1988), increases in availability of legal gambling in Australia have also occurred. Gambling in Australia previously consisted primarily of lotteries and racing, and that increases in the availability of gambling occurred in part because of technological developments (Productivity Commission, 1999). Gambling became more accessible with the availability of local TAB and EGM outlets in suburbia while electronic gambling devices allowed for faster play, and casinos allowed higher bets. As there have been increases in the number of people reporting problems resulting from their gambling, researchers have suggested that an epidemiological or public health approach to gambling may be appropriate (Chipper, Govoni & Roerecke, 2006).

Lund (2008) described the association between increases in 'consumption' of gambling and the proportion of heavy gamblers as conforming to single distribution theory. Ledermann originally proposed this in relation to alcohol consumption in France during World War II, where decreases in the availability of alcohol led to decreases in alcohol-related problems. Rose (1985; 1982) further developed this idea and applied the concept to both sick individuals e.g. those with high blood pressure and also to individuals who drank too much alcohol causing health problems. Ledermann observed that the distribution of alcohol consumption could be described by a lognormal curve that was positively skewed (skewed to the right tail) (Chipper et al., 2006). The distribution curve has since been described as uni-modal, positively skewed and approaching normal when log transformed (Chipper et al., 2006; Grun & McKeigue, 2000; Lund, 2008). Regarding a Ledermann curve, the number of people who have a problem (the tail of the distribution) depends upon the average level of consumption or use in the relevant population.

If consumption within the population has a skewed distribution, then changes in the mean level of consumption on a population level can result in significant changes to the heavy consumers but only slight changes in the rest of the distribution (Chipper et al., 2006; Lund, 2008). Grun and McKeigue (2000) argue that if the single distribution theory applies to gambling, there should be differences between communities in the frequency of excessive gamblers or gambling that correlate with measures of central tendency for those particular communities.

One way to determine if the single distribution theory applies is to examine how changes in governmental policy such as the introduction of a National Lottery, influences gambler behaviour (Grun & McKeigue, 2000). Grun and McKeigue (2000) examined expenditure on gambling using data from the Family Expenditure Survey before and after 1994, when the National Lottery was introduced in the UK. They found that the mean gambling expenditure rose from £1.45 a week (equivalent to 0.5% of household income) prior to the introduction of the lottery in 1993-1994 to £3.81 a week (equivalent to 1.5% of household income) in 1995-1996 and that this was almost exclusively due to expenditure on the UK lottery. Furthermore, the number of households gambling also increased from 40% to 75% after the introduction of the lottery. To examine potential problem behaviours, Grun and McKeigue (2000) then looked at the number of households spending more than £20 a week which increased from 0.8% of households to 3.2% of households after the introduction of the lottery) or more than 10% of their household income (almost a 4-fold increase). These findings provide support that the single distribution theory can be applied to gambling because there is a close relationship between the average expenditure level on gambling in the community and the proportion of gambling that may be regarded as excessive. Furthermore, this study also found that *increases in gambling problems exceeded the increases in the averages amounts of gambling*. A strength of this paper was to define excessive gambling as based upon household finance, as any financial hardship resulting from problem gambling is likely to affect more than just the individual concerned (Grun & McKeigue, 2000). However, a limitation in this paper was the reliance of using the Family Expenditure Survey as an index of gambling problems rather than a more specific gambling tool such as the CPGI or SOGS which are well validated tools and include items in addition to financial ones in relation to problem gambling.

Another study in Canada by Room, Turner and Ialomiteanu (1999) used telephone surveys to compare respondents in Niagara Falls before and after the opening of a Casino in 1996 and compared them with responses from control groups of participants living in the wider state on Ontario. This study included questions about individual's gambling behaviour, their gambling problems reported using the short SOGS, and responses about other people's perceptions of their gambling and whether any close friends or relatives had gambling problems. Room et al. (1999) found that although gambling in a casino increased in Ontario as a whole (11%) after the opening of the casino, that there was an even greater increase in the percentage of Niagara residents who had gambled in a casino after the survey (43%), and the average reported spending at casinos also significantly increased from $2.30 in a month to $11.10. Increases in the short SOGS also increased in the Niagara residents, with the proportion scoring 2 or more rising from 2.5% to 4.4%, and the proportion scoring 3 or more rose from 0.7% to 2.3%, with the authors using a cut-off score of 2 to indicate a problem gambler. However, as only the short measure of the SOGS was used no more information about problem gambling status could be ascertained from this study. In contrast, the problem gambling status of residents of Ontario (the control group) remained stable after the opening of the casino in Niagara. This paper demonstrated both increases in the amounts and frequency of visits to casinos following opening in Niagara and also an increase in problems arising from gambling providing support for the single distribution theory. Whether such increases in money spent or the number of people reporting problems with their gambling post-one year is similar or not is not known from this study.

Chipper et al. (2006) tested the applicability of the single distribution theory using archival survey data from 3,554 participants in Ontario, Canada. Their study sought to

determine if the population conformed to the features proposed by the single distribution theory, to determine the best measure of problem gambling that was associated with problem gambling and to determine the relationship between gambling 'consumption' and the risk of having a gambling-related problem. They found support for the theory with consumption of gambling and the amount of money being spent on gambling being highly skewed, and being 'normal' when log transformed. Multivariate logistic regression was then used to show that an individual's level of consumption of gambling was important as the odds of having problems associated with gambling (measured by CPGI) were greater for the fourth and highest quartile. Regarding the best measure of problem gambling, similar to the study by Grun and McKeigue (2000), it was found that the percentage of household income was the best predictor of gambling problems. This may be because this measure incorporates both a measure of the actual amount of money spent on gambling and the resources available for the individual to gamble (Chipper et al., 2006).

Lund (2008) has also found some support for the single distribution theory in relation to gambling by comparing three data sets of surveys (including a national survey of gambling in 2002, a school based survey in 2004 and a postal national survey in 2005). Lund (2008) found that the statistical assumptions of a Ledermann curve were satisfied (uni-modal, skewed right hand tail) in relation to gambling in Norway. In this study, there was a positive correlation between the mean gambling frequency and the proportion of frequent gamblers in each of the three surveys and Lund (2008) argues that this has implication for government policy regarding changes to gambling regulations. Lund argued that it is important to consider changes at the community level not just changes that target particular vulnerable groups who may develop gambling problems. To this end, Lund (2008) suggests that restricting availability (opening/closing hours, number of available games, restrictions on maximum bet) may be worthwhile policies for governments to take in relation to gambling. However, other authors (see Chipper et al., 2006) have suggested different approaches such as recommending 'safe levels of consumption' defined by percentage of house-hold income, in a similar way that governments help to prevent alcohol abuse and binging by proposing a safe level on the number of drinks that males and females can consume within a session.

Despite this, the relationship between increases in availability and problem gambling prevalence is not a simple linear one (Abbott, 2004). For example, in Australia the Productivity Commission's report found that with a number of different availability measures (e.g. EGM's per 1000 adults, EGM expenditure per adult and total continuous expenditure per adult) that there was a higher prevalence of problem gambling in Australian states where there was increased accessibility and expenditure (Productivity Commission, 1999), the report also showed that while the states with the highest availability (more EGMs and expenditure on gambling) had higher rates of problems associated with gambling, that increased availability *within* these states was not associated with increases in problem gambling prevalence (Abbott, 2001; Productivity Commission, 1999). Abbott, Williams and Volberg (1999) looked at problem gamblers after a period of seven years and suggested that problems related to gambling within a community may level out over time because of greater public awareness of potential problems that may be caused by gambling. There is likely to be more services and industry controls after the introduction of new gambling forms and that there is increased knowledge within the community of warning signs of problem gambling through advertising and public information campaigns. However, more research is needed addressing changes in problems related to gambling over time, especially in different jurisdictions, to determine how quickly these factors have an influence on problem gambling prevalence, and their relative influence compared with one another (Abbott, 2004). Abbott

(2006) concluded that the effects of exposure are complex and require considerations of the role of the individual and environmental risk and protective factors. Indeed, some researchers have likened the use of technologies such the internet to that of fads such as Citizen Band radios (Grohol, 1999).

2.3.2 Adolescents and availability

Adolescents are a group that may be of concern to governments and regulators when considering the impact of new forms of technology on gambling behaviour and problem gambling. Adolescents are likely to be amongst the first to use and accept new technologies such as mobile phones, the internet or computer games (Charness & Bosman, 1992; Kraut et al, 1996), and adolescents have been shown to be vulnerable to developing gambling problems on Electronic Gaming Machines. For instance, in a case study of an 14 year old adolescent male with gambling problems, Griffiths (1993b) attributed the adolescent's gambling problems to the widespread exposure of fruit machine gambling in the sea-side town where he lived, and the routine exposures that he had with one particular location where a fruit machine was present.

Previous research in the UK by Griffiths (1990; 1993a; 1993b) has demonstrated adolescents become problem gamblers on slot/fruit machines. For example, in examining the acquisition, development and maintenance of adolescent problem gamblers who played fruit machines, Griffiths (1990) interviewed 50 participants (mean 16.2 years old) and found that 9 were classifiable as pathological gamblers based on APA criteria. 48% of the sample stated that they began gambling with friends, while 28% did so with their parents and the primary reason for gambling on the fruit machines initially was fun (84% of sample). Reasons for continued playing were also explored, with fun (84%) still the primary motivation and interestingly, 10% reported they could not stop, and 20% reported they would miss it if they did stop. Griffiths (1990) suggested that these results demonstrate that while sociological factors such as playing for fun are important in the development of social gambling within an adolescent population, that other psychological or physiological factors may be associated with adolescents who go on to develop problems. This has been supported by further research by Griffiths (1993a) who examined mood changes in adolescents before, during and after gambling on fruit machines via an anonymous survey sent to a network that provided support for adolescent gamblers. 19 questionnaires were returned (mean age 18.7 years), and of these 16 were probable pathological gamblers according to DSM-III-R criteria. Regarding mood before play, a majority of adolescents reported being in a good mood or being happy (14/19), which was maintained during play (12/19), but not after play (7/19). During play a majority of participants reported a feeling of not wanting to stop or being unable to stop playing (14/19), however this is not surprising given the probable pathological classification of these participants. Interestingly after play, a bad or angry mood was reported by 13/19 participants and 14/19 wished they were still playing. These findings suggest that adolescents may develop problems controlling their levels of use of electronic devices such as Electronic Gaming Machines, and as they are more likely to take up new technology (Charness & Bosman, 1992), this is a group that is potentially at higher risk of developing problems with emerging technologies.

Deverensky and Gupta (2007) have recently argued that internet gambling may be particularly attractive to adolescents because of their more sophisticated knowledge of the internet combined with their like of high-paced, colourful videogames and the convenience of gaining access in their own homes. Some previous research has also considered the effects of

gambling availability on this age group (see Deveresnky & Gupta, 2007). For example, Griffiths (1995) has highlighted the importance of technological advances being incorporated into gambling devices particularly for the adolescent age group. In some early research, Acuri et al. (1985) explored gambling behaviour of 332 High School students in Atlantic City after the legalisation of Casinos in the area. They found that the increased access to gambling resulted in an increase in problem gambler numbers. They note that from 1978-1982, the number of GA chapters in the local area increased from 15 to 32 while no other state at this time in the US had similar rises in the number of GA chapters.

In the UK, Fisher (1993) found that in a sea-side town where fruit-machine gambling was available to adolescents all year round, that 62% of adolescents (11-16) had played the machines at least once in the past year, that 17.3% had played them at least once a week and that 5.7% were gambling pathologically as measured by the DSM-IV-J. The increased availability of gambling to adolescents in this study was also associated with increases in both school and family problems and use of deception by adolescents with 37% of adolescents having borrowed money to play fruit machines, 11% having stolen from family or friends and 21% having used either food or bus money to play the machines (see also Fisher, 1991).

2.3.3 Other important factors in addition to availability

In addition to availability, other factors have been found to be important in problem gambling prevalence. Lester (1994) compared the availability for gambling in each state in the USA to the number of chapters of GA divided by population. It was found that the type of gambling (specifically card rooms, casinos, poker machines and sports betting), was important in the association between availability and number of problem gamblers. This early finding suggests than in addition to increased availability, the type of game offered is important in the prevalence of problem gamblers. However, there are problems with this methodology because 1) not all problem gamblers will go to GA meetings, and 2) people may cross state borders to gamble.

Abbott and Clarke (2007) note that the increasing availability of gambling has frequently been cited as contributing to problem behaviours (Abbott & Clarke, 2007), but in addition there are specific characteristics of different games that have been found to make them more 'addictive' such as: a short time between a wager and payout; opportunities for frequent or multiple wagers; intermittent reinforcement schedules; frequent near misses and frequent small wins or payouts (see Griffiths, 1999).

In exploring the availability hypothesis, Welte et al. (2007) cite two prominent researchers within their paper who have opposing views. Alex Blasczynski (2005) who indicated that both health and consumer policies are based on the notion that people have the capacity and freedom to make sensible choices and Robin Room (2005) who suggested that more liberal laws for gambling will lead to more gambling problems using alcohol as a comparator.

Welte et al. (2007) noted that both arguments have empirical evidence to partially support them. For example, in the 1975 US national survey (Kallick et al., 1979) there were higher rates of problem gamblers in Nevada 2.35% (where gambling was more freely available) compared to the US national average of 0.77%. Whilst, Wallisch (1996) in a

survey in Texas found that after introduction of state lottery there were no increases in gambling-related problems.

Welte et al. (2007) have considered other social variables and their relative impact in the prevalence of gambling problems. They conducted a telephone survey of 2631 adults aged 18 or over in order to further explore factors which may contribute to the availability hypothesis. Using the DSM criteria and the SOGS as measures of problem gambling, they found differences related to different games and their contribution to problem gambling. Casinos and video keno (EGMs) were the highest contributors and casino convenience (defined as within 10 miles), and family and friends' approval of gambling also increased risk of problems particularly for males aged over 30 years.

Other researchers have considered the problem from the treatment or counselling side. For example, Rush et al. (2007) looked at whether proximity to treatment venues was associated with lower prevalence of gambling problems as a result of a positive treatment impact. This study used the CPGI as the measure of problem gambling on 244 people aged 15 and above. Treatment accessibility was measured by the distance to closest treatment centre, the capacity of that centre and the estimated waiting time for treatment. The authors found that there was no effect of treatment accessibility upon risk of gambling problems. It is possible that the wrong variables were chosen for predictors of a positive treatment impact, or that people prefer telephone service for gambling problems. The lack of findings in this study may be related to the fact that only a small proportion of the community seek help for a gambling problem (1-2%).

Welte et al. (2004) were interested in neighbourhood disadvantage, the presence of a casino within 10 miles of the person's home, and the permissiveness of a state's gambling laws and how these measures were related to frequency of gambling in the past year, and incidence of problem/pathological gambling. The methodology used was a national telephone survey in the US, resulting in 2638 complete interviews for analysis. The authors found that neighbourhood disadvantage had no relationship with past year gambling, but it was related to frequency of gambling and pathological/problem gambling. Their calculation of odds ratio (OR) of 1.69 demonstrated that for every increase of 1 standard deviation in neighbourhood disadvantage, the odds of being a problem gambler increased by 69%. A casino within 10 miles of a person's home had a significant effect on problem gambling, with an OR of 1.9 – i.e. a 90% increase in odds of being a problem gambler. The permissiveness of a state's laws had an effect on past year gambling or frequency but it did not have an effect on problem gambling. The OR of 1.17, demonstrated that for every additional form of gambling available within a state, a person's odds of having gambled in the past year increased by 17%.

Other authors have also commented on the interaction between personal vulnerabilities and social setting as playing a role in problem gambling development. This includes issues of public health and socio-cultural influences and also exposure to gambling products (Shaffer, 2005). For example, Shaffer (2005) in a commentary included a discussion of gambling availability and subsequent problem gambling prevalence. He noted that in jurisdictions where gambling is more recently legalised such as Missouri and Iowa in the US there is an increase in the number of calls to problem gambling hot-lines. However in more established gambling areas such as Nevada exposure to gambling has a less adverse effect on similar measures. For example, while people in Nevada have an eight fold greater exposure to gambling products than that of the next biggest gambling state (New Jersey), Nevada does not contain a proportionately greater number of problem gamblers. In fact, Shaffer points out

that Nevada has less gambling-related problems than other states that have less access to casinos.

In a discussion of the introduction of sunday race betting in the UK, Neal (2005) offered another reason for increased availability not to equate with increased wagering. For these UK horse race gamblers they had a routine sustained by psychological, sociological and economic factors. Neal (2005) commented that gamblers had a finite budget. Sunday betting was a novelty for punters, and an increase in action during Sunday trading required a decrease in action elsewhere in the week.

2.3.4 The regional exposure model

Despite previous research suggesting that availability may lead to an increase in gambling-related problems, the previous section has highlighted a number of other variables, both at the individual and social levels that may influence the prevalence of problem gambling. Shaffer et al. (1999) conducted a meta-analysis of prevalence estimate studies from the US and Canada, divided intro 4 different groups: adult studies, adolescent studies, college student studies and adults in prison or treatment for psychiatric illness or substance abuse.

Shaffer et al. (1999) found that prevalence differed amongst these groups with adolescents, college students and adults in prison/treatment yielding higher prevalence estimates of being a 'problem gambler' compared to adults. However, this finding should be interpreted with caution as adolescent problem gambling prevalence has been debated in the literature, with some authors suggesting inflated estimates (Blaszczynski, 2005). Hence further research needs to be conducted.

Shaffer et al. (1999) also noted that the prevalence of problem gambling from 1974-1997 has increased in the US and Canada, and suggested that this is due to an interaction between personality and social setting. They suggested that adults are more sensitive to illicit behaviours compared with adolescents, those in prison and college students and so adults are less likely to engage in problem gambling. Furthermore, as gambling has become more acceptable within the community during this time period, adults have begun to gamble more, while the other populations (adolescents, students, those in prisons/treatment) would not have avoided gambling prior to this just because it is illicit. Therefore some newly exposed adults are having difficult adjusting to gambling and show problems whereas there are others (adolescents/students/treatment) that already had problems (Shaffer et al., 1999).

In this study, Shaffer et al. (1999) also suggested that there may be an age cohort effect. The higher prevalence of adolescent and college gamblers is likely due in part to the increased availability and acceptance of gambling compared to when their parents were in the same age group. The authors suggested the prevalence of problem gambling may increase as these adolescents grow into adults. They also acknowledge that this may not be the case and that prevalence estimates may remain stable or even decrease – because after a group have gained experienced with gambling they adapt by protecting themselves from the negative consequences of gambling through a social learning process.

Participation in gambling is necessary for it to become a problem. Availability has therefore often been a factor associated with increased rates of problem gambling. This is often referred to as exposure theory in that exposure to the object of addiction will lead to an increasing level of pathology. Objects of addiction be they it drugs, alcohol or gambling can

overpower human will and compromise people's capacity to live harmoniously with those activities or objects (Shaffer, 2005).

In order to explore the relationship between availability and gambling behaviour in an empirical way, Jacques et al. (2006) looked at the impact of a new Casino opening by comparing gambling habits of those in the immediate region (Hull) compared to those in a comparison group without a casino (Quebec City). Data were collected pre- and post-casino opening, with data collected one year, two years and four years after opening. The authors hypothesised that people in Hull would show an increase in frequency of participation, increase in maximum amount of money lost in 1-day's gambling and have a greater number of problem and at-risk gamblers compared to Quebec City. It was found that one year after the casino opened there was a significant increase in gambling activities, and the money lost in Hull vs Quebec City, but that this effect was not evident at either two or four years post-opening. Also the authors did not see an increase in the number of problem gamblers or at risk gamblers over the 4-year period (total number, incidence or new gamblers). Jacques et al. (2006) suggest that these results support the regional exposure model suggested by Shaffer et al. (2004). Here the social adaptation capacity of gamblers is emphasised, such that after being exposed to a product (i.e. gambling) they dynamically change their behaviour in response to exposure. This also highlights the principle of novelty. While initially new gambling stimulates interest, through social learning people adapt to novelty and the initial increases in behaviour will decline. Problem gambling prevalence levels out and even may decline despite increased availability. Greater public awareness of potential problems, more services and industry control are likely contributors – but what is not known is how quickly they have influence, or their relative influence (Abbott, 2004).

2.3.5 Implications
Changes in legislation that increase the availability of gambling-related products may contribute to an increase in problems related to gambling in the short term. Such changes may soon include increases in the availability of gambling through new forms of technology such as the internet, mobile phones and interactive TV services. In fact, Leppaniemi and Karjaluoto (2005) suggested that consumer's willingness to uptake new advertising technology on their mobile phones is based on a number of factors including the one-on-one marketing ability of the medium, provided that regulatory bodies can assure people's privacy. In addition to the increased availability, any increase in problems may reflect an absence of protective measures in the community (e.g. public awareness of gambling problems, access to treatment) or an initial increase in the popularity of a new form of gambling that will eventually taper out. One group of particular interest to both researchers and clinicians is adolescents because of their willingness to take up new forms of technology, and also their like of gambling and gambling-like products. Given suggestions that it will be difficult to controlling electronic gambling, and acknowledging potential relationships between availability and problems, a consideration of control theory seems appropriate.

2.4 Control Theory

2.4.1 Ashby's law of requisite variety
Ashby's law of requisite variety has been used by researchers in a variety of fields from cybernetics, control theory, business and sociology. The law was originally applied in the field of Cybernetics (Ashby, 1956), but is useful in describing any situation where control or regulation is necessary. Simply stated the law proposes that in order for a system to be

controlled, the variety in the number of states or behaviours of the *control system* (or regulator) must be equal to or larger than the number of states or behaviours that are possible within the system as a whole (Ashby, 1956; Conant & Ashby, 1970). To provide a more concrete example, a system that has 6 possible states but only three control settings will tend to fluctuate in a relatively uncontrolled fashion at any specific control setting.

The goal of the law of requisite variety is to maintain system stability. While simple systems require only a few controls, more complex systems that involve both technology and human interaction require many more controls. Love and Cooper (2007) have suggested that variety equates to anything within a system that can be modified, and may include elements such as information, organisational structures, system processes, participants, ownership and control. In complex systems it may be impossible to control for every variable, so most variety is absorbed through relationships with other systems. Where controls are necessary, they may be designed into the system, distributed locally or generated by alignment with common goals.

Conversely, Ashby's law also acknowledges that a flexible system with many available options is better able to cope with change. A strict system that is optimised for only one or two sets of conditions may be more efficient when those conditions prevail, but the system will fail if any condition were to change. Therefore, the more options that a controller or regulator has, the better able it is to deal with fluctuations or variance within a system (Hollnagel, 2002). Despite its origins within the field of cybernetics and modelling, Ashby's law of requisite variety may be applied to other fields such as business and the government regulation of gambling as discussed below.

2.4.2 The law of requisite variety in business

A business must have sufficient decision-making processes and information in order to deal with changes in their environment (Lewis & Stewart, 2003). Phillips and Tuladhar (2000) have used the criteria of flexibility and efficiency from the concept of Ashby's law to look at how these facets can affect how successful a business will be. Phillips and Tuladhar (2000) argued that while flexibility in the form of the number of responses that a business is capable of offering is desirable, each alternative product or service also involves costs. A business must therefore weigh up the costs in time, money and resources in offering a particular product of service versus consumer demand or response (see Figure 2.3 from Lewis & Stewart, 2003).

Figure 2.3. The application of Ashby's law to organisational performance
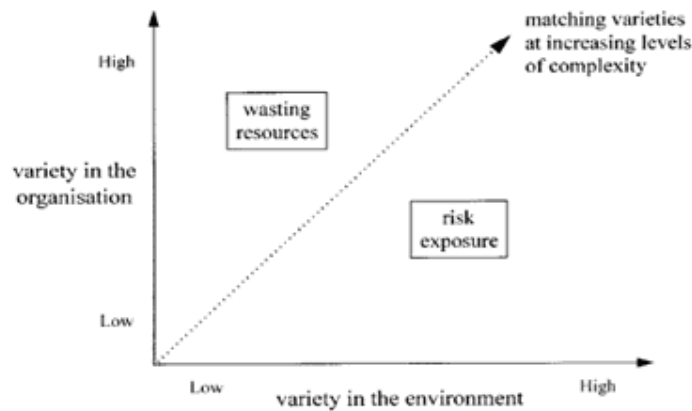
As can be seen in Figure 2.3, according to Ashby's law in order for a business to be able to negotiate in a dynamic market, they must match the variety present in the organisation, to that of the environment. However, one limitation of the law in this setting is that variety of an organisation may be hard to define and/or measure (Lewis & Stewart, 2003).

In addition, agility or capacity to change in the dynamic marketplace is also important within a business setting because a company may be able to offer more alternatives by being more efficient with their resources for example by hiring less experienced staff (Phillips & Tuladhar, 2000), phasing out products or services or engaging in alternative modes of service delivery (e.g. online rather than via shopfront). This may create other problems however in the global economy where countries or businesses with more regulations become unable to compete with businesses who do not have the same set of regulations creating a 'race to the bottom' phenomena (Porter, 1999).

2.4.3 The law of requisite variety and regulation

Regulation of internet gambling is a serious concern for governments, given that the internet provides 24 hour access to gambling-related products (Griffiths, 1996; Smeaton & Griffiths, 2004; Wood, Griffiths & Parke, 2007). In the years 1996-2006, Internet gambling became a multibillion dollar industry (Scoolidge, 2006), and may continue to grow as it offers some perceived advantages to players over a land-based casino. Toneguzzo (2000) noted that the internet has provided people with the ability to instantly interact (and gamble) with a site anywhere in the world and Wood, Williams and Lawton (2007) found that even in jurisdictions where gambling is legal in pubs/clubs/casinos, on-line gambling still attracts people because it is convenient, players can avoid the negative aspects of being in a casino and other punters and because on-line casinos provide for faster play.

Regulators are able to control gambling in a number of ways. Eadington (1999) considered the more traditional regulation of casino gambling in the United States. He noted that in Nevada, a casino needs to obtain a license from the State Gaming Control Board. In order to obtain an unrestricted license (allowing for any number of poker machines, table games etc.) the casino needs to satisfy a number of criteria including meeting probity standards and having sufficient capital (Eadington, 1999). However, unrestricted licensing

makes control or regulation by government's more difficult (Eadington, 1999; Sternleib & Hughes, 1983), and allows casinos who meet the criteria for an unrestricted licence much variety in their available products offered.

Regulation or control by governments in the field of gambling has occurred in many ways in order to limit the variety of available behaviour, and can be classified under the following categories:

a) **Exclusivity regulation:** Where legalised gambling is confined to one or a limited number of large scale establishments (e.g. EGM in WA), or time-limits on gambling operations are imposed. Eadington (1999) has argued that this approach was taken in New Orleans and Detroit for not only positive economic impact but because the casinos would be easier to regulate.

b) **Area regulation**: Where legalised gambling is limited to specific districts or constituents.

c) **Number of available devices/games:** Where the number of tables or poker machines in an establishment is controlled or where there are limits on the types of games a club is able to offer.

d) **Wager regulation:** Where maximal bets per hand/session are enforced. For example, in Queensland legislation allows players to set maximal bets per hand or per session (Jackson, 1998).

e) **Regulation of advertising of gambling-related products:** For example curtailing advertising of EGM in Victoria, or banning the depiction of gambling coupled with alcohol consumption in Queensland.

Much like flexibility and efficiency needed to be balanced in a business setting in order to be successful, the availability of and use of different controls available to governments, must be balanced against the consequences of excess regulation. If governmental regulation of gambling is too strict, it encourages illegitimate gambling in unregulated casinos or on the internet, each bringing a different set or problems, and a loss of control (Reuter, 1983). Toneguzzo (2000) has previously argued that both at State and Federal level in Australia, governments should be keen to build an internet gaming presence to maintain order and a credible alternative versus unregulated on-line gaming sites.

More recent challenges to government regulation of gambling include newer forms of gambling such as internet casinos, interactive gambling utilising iTV or *Foxtel*, mobile or SMS competitions where part of the cost of the call contributes to the prize or profit for the promoter, and network games that are played for money (Jackson, 1998). The specific challenges to governments include: a difficulty in identifying owners or controllers of internet businesses or where they are located (Toneguzzo, 2000); businesses storing tax records overseas (if at all) (Jackson, 1998); and using technology to change the nature of products, and hence the income able to be derived from government taxes (Jackson, 1998). For example, in the U.S. some states have passed laws with partial prohibition of gambling, but have no mention of Internet gambling, and this may provide a regulatory loophole that operators can exploit (Scoolidge, 2006). Each of these issues provides a challenge to governments because without adequate and appropriate regulation revenue will be lost (Jackson, 1998).

A number of authors have argued that regulation of these newer forms of technology is vital (Jackson, 1998; Parke & Griffiths, 2004; Scoolidge, 2006; Toneguzzo, 2000). In particular, regulation needs to address the following issues:

1) Players need to be protected. For example, Parke and Griffiths (2004) have argued that
with new technology it may be possible to make gambling games more addictive on
the internet, and to increase their appeal or arousal (see Sévigny, Cloutier, Pelletier, &
Ladouceur, 2005). Furthermore, because of the nature of the technology itself,
players have no way of ensuring whether on-line traders are running a fair game, and
whether they are paying out at the odds stated on their web-site, if such a statement is
even made available to players and whether they have reliable systems to protect
player's credit card details (Scoolidge, 2006).

2) The broader social impact of these forms of gambling need to be better understood,
including gambling within the workplace and individual personality characteristics
such as self-esteem, competitiveness and social facilitation within internet gamblers
(Griffiths & Parke, 2002).

3) Access of problem gamblers and underage gamblers to these outlets of gambling need to
be considered, as does the potential addictiveness of on-line forms of gambling (Parke
& Griffiths, 2004).

2.5 Attempts to control access to the proposition

When gaming occurs in a face-to-face mode using cash it is possible that no other
parties are involved, but when gaming occurs in an electronic format, it is more likely that
other organisations are party to the process. The establishment of gaming using information
and communication technologies can require appreciable capital investment (Eadington,
2004), nevertheless the necessary infrastructures are already very well developed
(Toneguzzo, 1995). Developments in existing infrastructure and communication protocols
for the commerce sector, have assisted the development of electronic gaming. In particular,
the technology has created "loopholes" to provide access to a gaming product (Eadington,
1988) (see
http://www.guardian.co.uk/technology/2005/feb/10/mobilephones.onlinesupplement).
Developments in the areas of mobile phone capability (Curwen & Whalley, 2008), social
networking technologies that allows online poker (see
http://www.govtrack.us/congress/billtext.xpd?bill=s110-3616), and interactive television
(http://www.twowaytv.com.au/) have the potential to assist further expansion. By our 2008
estimates 68.1% of university students have web enabled mobile phones (Phillips, Jory,
Wijenayake, & Hii, 2010), and some computer game platforms (e.g. *Playstation*) are web
enabled, thus there is already the potential for people to be accessing online casinos, or
purchasing lotto tickets, betting on horses or sporting events. In particular, the
ubiquitousness of mobile phones means everyone may have access to their own electronic
gaming machine in the near future (Finn, 2005) (see
http://www.blackberrycool.com/2005/02/golden-palace-blackberry-version-reviewed/).
Irrespective of whether Australia legalises gaming on mobile phones or interactive
televisions, there is already a loophole whereby people could be placing bets legally in
Australia using web enabled devices.

Even if internet gaming exploits a "loophole" in legislation (Eadington, 1988), the
involvement of other organisations in the gaming process is an important consideration. For
instance the proposition may be hosted by a commercial internet service provider. Where a
government deems the activity inappropriate, legal action can be taken against the internet
service provider (ACMA, 2009, ch. 4).

There are attempts being made to control illegal activities occurring on the internet, by targeting these third parties. For instance, there are a number of methods for blocking Spam, either by prosecuting the producers, disconnecting the companies hosting sites associated with Spam (or implementing filters) (ACMA, 2009, ch. 4). For mobile phones the relevant organisations would include hardware manufacturers, software suppliers, the telecommunication carriers (Finn, 2005) and potentially the gaming industry where gambling on mobile phones is legalised.

Companies hosting inappropriate information have been prosecuted internationally. For instance, The French government took action against Yahoo for hosting sites that engaged in the sale of Nazi memorabilia (http://news.bbc.co.uk/1/hi/world/europe/760782.stm), and more recently the USA and the European Union have taken steps against companies that host child pornography (ACMA, 2009). To maintain their corporate credibility Yahoo ceased their support of the traffic of Nazi memorability in France (although the activity still occurred in other countries) (Scheeres, 2001). For similar reasons internet service providers are distancing themselves from child pornography. These trends also extend to gambling. For instance Yahoo lists the advertising of online gambling as a form of unacceptable content that may be taken down (http://help.yahoo.com/l/us/yahoo/ysm/sps/articles/editorial9.html). For mobile phones in Australia game distribution occurs at a national level, but censorship has been an issue handled at the state level (Finn, 2005)

However, the efforts towards internet censorship have drawn criticism. Attempts have been made by the Chinese government to regulate the free transmission of information. The Chinese government refuses to allow internet providers to operate in their country unless provision be made for the censorship of certain words (e.g. freedom, democracy) (http://www.hrw.org/en/news/2006/08/08/china-internet-companies-aid-censorship). There has been concern about American countries voluntarily restricting freedom of speech, and censorship has been equated with a restriction of trade (Economy & Levi, 2006; Richtel, 2004). Indeed American efforts to curb online gambling have been challenged by Antigua, with the World Trade Organisation ruling that America's ban on gambling over the Internet violated Antigua and Barbuda's rights as members of the W.T.O. (Rivlin, 2007, Scoolidge, 2006).

2.6 Summary

Gambling may be viewed as a form of entertainment, but consumers may require protection if gambling is promoted as a source of wealth. Technology potentially exploits loopholes that circumvent regulatory controls, increasing access to gambling products. Relationships between availability of products such as alcohol and the problems caused were considered. Alcohol-related problems are linked to availability, and government attempts to control harm primarily seek to restrict access, but there are some indications that this is less effective for problem drinkers. Although there may have been relationships between availability and problem gambling, they appear to have been mitigated by community controls. However, technology has the potential to increase the accessibility of gaming. Attempts can be made to control electronic gambling propositions, by targeting organisations that host gaming sites.

2.7 References

Abbott, M. (2006). Do EGMs and problem gambling go together like a horse and carriage? *Gambling Research, 18*(1), 7-38.

Abbott, M.W. (2001). *What do we know about gambling and problem gambling in New Zealand?* Report number seven of the New Zealand Gaming Survey. Wellington: Department of Internal Affairs.

Abbott, M.W., & Clarke, D. (2007). Prospective problem gambling research: Contribution and potential. *International Gambling studies, 7*(1), 123-144.

Abbott, M.W., Williams, M. & Volberg, R.A. (1999). *Seven years on: A follow-up study of frequent and problem gamblers living in the community. Report number two of the New Zealand Gaming Survey*. Wellington: Department of Internal Affairs.

Abbott, M.W., & Volberg, R.A. (1996). The New Zealand national survey of problem and pathological gambling. *Journal of Gambling Studies, 12*(2), 143-160.

Abbott, M., Volberg, R., Bellringer, M., & Reith, G. (2004). *A review of research on aspects of problem gambling*: Final report. Prepared for the responsibility in gambling trust, UK. Auckland, New Zealand: Gambling research centre, Auckland University of Technology.

Abbott, M.W., Volberg, R.A., & Ronnberg, S. (2004). Comparing the New Zealand and Swedish national surveys of gambling and problem gambling. *Journal of Gambling Studies, 20 (*3), 237-258.

ACMA, (2005). *Mobile telecommunications services . Telecommunications Performance Report 2004-2005.* Chapter 5.

ACMA, (2008). *Australian Communications and Media Authority. Communications Report 2007-2008.*

ACMA, (2009). *Mobile phone technology and special features fact sheet*.

ACMA (2009). Developments in internet filtering technologies and other measures for promoting online safety. [Downloaded 27th April 2009 from http://www.acma.gov.au/webwr/_assets/main/lib310554/developments_in_internet_filters_2ndreport.pdf]

Agostinelli, G., & Grube, J.W. (2002). Alcohol counter-advertising and the media: a review of recent research. *Alcohol Research & Health, 26*(1), 15-21.

Arcuri, A.F., Lester, D., & Smith, F.O. (1985). Shaping adolescent gambling behavior. *Adolescence, 20,* 935-938.

Ashby, W.R. (1956). *An introduction to cybernetics.* London: Chapman Hall.

Australian Bureau of Statistics (2008a). *Household Use of Information Technology, Australia, 2007-08*. Publication No. 8146.0

Australian Bureau of Statistics (2008b). *Australian Historical Population Statistics, 2008*. Publication No. 3105.0.65.001

Babor, T.F., Mendelson, J.H., Greenberg, I., Kuehnle, J. (1978). Experimental analysis of the "happy hour": effects of purchase price on alcohol consumption. *Psychopharmacology, 58,* 35-41.

Blaszczynski, A. (2005). To formulate gambling policies on the premise that problem gambling is an addiction may be premature. *Addiction, 100,* 1226-1239.

Breen, R.B., & Zimmerman, M. (2002). Rapid onset of pathological gambling in machine gamblers. *Journal of Gambling Studies, 18*(1), 31-43.

Budde, P. (2009). Australia pay tv statistics: Subscribers, overview and analysis. Paul Budde Communication Pty Ltd

Campbell, F., & Lester, D. (1999). The impact of gambling opportunities on compulsive gambling. *The Journal of Social Psychology, 13,* 126-127.

Charness, N. & Bosman, E.A. (1992). Human factors and age. In F.I.M. Craik & T.A. Salthouse (Eds.), *The handbook of aging and cognition* (pp. 495-551). Hillsdale, NJ: LEA.

Chikritzhs, T., Stockwell, T., & Masters, L. (1997). *Evaluation of the public health and safety impact of extended trading permits for Perth hotels and nightclubs*. National Centre for Research into the Prevention of Drug Abuse: National Drug Research Institute.

Chipman, M., Govoni, R., & Roerecke, M. (2006). *The distribution of consumption model: An evaluation of its applicability to gambling behaviour*. Final Report for the Ontario Problem Gambling Centre, March 2006.

Conant, R.C., & Ashby, W.R. (1970). Every good regulator of a system must be a model of that system. *International Journal of Systems Science, 1*(2), 89-97.

Cook, P.J., & Moore, M.J. (2002). The economics of alcohol abuse and alcohol-control policies. *Health Affairs, 21*(2), 120-133.

Cooke, E., Hastings, G., Wheeler, C., Eadie, D., Moskalewicz, J., & Dabrowska, K. (2004). Marketing of alcohol to young people: A comparison of the UK and Poland. *European Addiction Research, 10,* 1-7.

Cox, B.J., Yu, N., Afifi, T.O., & Ladouceur, R. (2005). A national survey of gambling problems in Canada. *Canadian Journal of Psychiatry, 50* (4), 213-217.

Curwen, P., & Whalley, J. (2008). Mobile communications in the 21st century. In A.C. Harper & R.V. Buress (Eds.), *Mobile telephones: Networks, applications and performance* (pp. 29-75). New York: Nova Science Publishers.

D'Abbs, P., & Togni, S. (2000). Liquor licensing and community action in regional and remote Australia: a review of recent initiatives. *Australian and New Zealand Journal of Public Health, 24*(1), 45-53.

Delfabbro, P. (2008). Evaluating the effectiveness of a limited reduction in electronic gaming machine availability on perceived gambling behaviour and objective expenditure. *International Gambling Studies, 8*(2), 151-165.

Dept of Education, Employment and Workplace Relations, (2008). *Experience the Digital Revolution*. National Secondary School Computer Fund Overview. Retrieved 19 June, 2009 from http://www.deewr.gov.au/Schooling/DigitalEducationRevolution/ComputerFund/Pages/NationalSecondarySchoolComputerFundOverview.aspx

Dowling, N., Smith, D., & Thomas, T. (2005). Electronic gaming machines: Are they the 'crack-cocaine' of gambling? *Addiction, 100*(1), 33-45.

Eadington, W.R. (1988). Loophole legalization: The process of the spread of commercial gambling without popular or legislative intent. (pp. 1- 12). In M. Dickerson (Ed.), *200-up* (pp. 1-12). Proceedings of the 3rd National Conference of the National Association for Gambling Studies, Canberra.

Eadington, W.R. (1995). Economic development and the introduction of casinos: Myths and realities. *Economic Development Review*, Fall, 51-54.

Eadington, W.R. (1996). The legalization of casinos: Policy objectives, regulatory alternatives, and cost/benefit considerations. *Journal of Travel Research, 34*, 3-8.

Eadington, W.R. (1998). Contributions of casino-style gambling to local economies. *The Annals of the Americal Academy of Political and Social Science, 556*, 53-65.

Eadington, W.R. (1999). The economics of casino gambling. *Journal of Economic Perspectives, 13*(3), 173-192.

Eadington, W.R. (2004). The future of online gambling in the United States and elsewhere. *Journal of Public Policy & Marketing, 23*(2), 214-219.

Economy, E.C. & Levi, M.A. (2006). Help U.S. firms free China's Web. [downloaded 24th April from http://www.cfr.org/publication/10500/help_us_firms_free_chinas_web.html]

Finn, M. (2005). Gaming goes mobile: Issues and implications. *Australian Journal of Emerging Technologies and Society, 3*(1), 31-42.

Fisher, S. (1991). Governmental response to juvenile fruit machine gambling in the U.K: Where do we go from here? *Journal of Gambling Studies, 7*(3), 217-247.

Fisher, S. (1993). Gambling and pathological gambling in adolescents. *Journal of Gambling Studies, 9*(3), 277-288.

Forster, J.L., Murray, D.M., Wolfson, M., & Wagenaar, A.C. (1995). Commercial availability of alcohol to young people: Results of alcohol purchase attempts. *Preventive Medicine, 24,* 342-347.

Griffiths, M.D. (1990). The acquisition, development, and maintenance of fruit machine gambling in adolescents. *Journal of Gambling Studies, 6*(3), 193-204.

Griffiths, M.D. (1993a). Factors in problem adolescent fruit machine gambling: results of a small postal survey. *Journal of Gambling Studies, 9*(1), 31-45.

Griffiths, M.D. (1993b). Fruit machine addiction in adolescence: A case study. *Journal of Gambling Studies, 9*(4), 387-399.

Griffiths, M.D. (1995). *Adolescent gambling*. London: Routledge.

Griffiths, M.D. (1996). Gambling on the internet: A brief note. *Journal of Gambling Studies, 12,* 471-473.

Griffiths, M.D. (1999). Gambling technologies: Prospects for problem gambling. *Journal of Gambling Studies, 15*(3), 265-283.

Griffiths, M.D. (2003). Internet gambling: Issues, concerns and recommendations. *CyberPsychology and Behavior, 6,* 557-568.

Griffiths, M.D., & Parke, J. (2002). The Social Impact of Internet Gambling. *Social Science Computer Review, 20*(3), 312-320.

Griffiths, M.D., & Wood, R.T.A. (2000). Risk factors in adolescence: The case of gambling, video-game playing and the internet. *Journal of Gambling Studies, 16,* 199-225.

Grinols, E.L. (2001). Cutting the cards and craps: Right thinking about gambling economics. [downloaded May 1, 2009, from http://www.voicesoftheheartland.org/Reference/Grinols-Cutting%20Cards%20and%20Craps.pdf]

Grohol, J.M. (1999). Internet addiction guide. [downloaded April 18, 2002, from http://www.psychcentral.com/netaddiction/]

Gruenewald, P.J., Madden, P. & Janes, K. (1992). Alcohol availability and the formal power and resources of state alcohol beverage control agencies. *Alcoholism: Clinical and Experimental Research, 16,* 591-597.

Grun, L. & McKeigue (2000). Prevalence and excessive gambling before and after introduction of a national lottery in the United Kingdom: another example of the single distribution theory. *Addiction, 95*(6), 959-966.

Her, M., Giesbrecht, N., Room, R., & Rehm, J. (1999). Privatizing alcohol sales and alcohol consumption: evidence and implications. *Addiction, 94*(8), 1125-1139.

Hollnagel, E. (2002). Time and time again. *Theoretical Issues in Ergonomics Science, 3(2), 143-158.*

Huckle, T., Conway, K., Casswell, S., & Pledger, M. (2005). Evaluation of a regional community action intervention in New Zealand to improve age checks for young people purchasing alcohol. *Health Promotion International, 20*(2), 147-155.

Holder, H.D., Saltz, R.F., Grube, J.W., Voas, R.B., Gruenwald, P.J., & Treno, A.J. (1997). A community prevention trial to reduce alcohol-involved accidental injury and death: overview. *Addiction, 92(*Supp. 2), S155-S171.

ITU, (2003). *The birth of broadband.* Media Fact Sheet. International Telecommunication Union. September. Retrieved 12 June, 2009 from http://www.itu.int/osg/spu/publications/birthofbroadband/faq.html

Ivory, J.D., & Magee, R.G. (2009). You can't take it with you? Effects of handheld portable media consoles on physiological and psychological responses to video game and movie content. *CyberPsychology & Behavior, 12*(3), 1-7.

Jackson, A.C. (1998). *Gambling, technology and society: Social Issues.* Gambling, Technology and Society: Regulatory challenges for the 21st century, Sydney, 7-8 May, 1998.

Jacques, C., & Ladouceur, R. (2006). A prospective study of the impact of opening up a casino on gambling behaviours. *Canadian Journal of Psychiatry, 51,*(12), 764-773.

Jernigan, D.H., Ostroff, J., Ross, C., & O'Hara, J.A. (2004). Sex differences in adolescent exposure to alcohol advertising in magazines. *Archives of Paediatric Adolescent Medicine, 158,* 629-634.

Jones, S.C., & Lynch, M. (2007). Non-advertising alcohol promotions in licensed premises: does the code of practice ensure responsible promotion of alcohol? *Drug and Alcohol Review, 26,* 477-485.

Kraut, R., Scherlis, W., Mukopadhyay, T., Manning, J., & Kiesler, S. (1996). Homenet field trial of residential Internet services. *Communications of the ACM, 39*, 55-63.

Kuo, M., Wechsler, H., Greenberg, P., & Lee, H. (2003). The marketing of alcohol to college students. *American Journal of Preventive Medicine, 25*(3), 204-211.

Leppaniemi, M., & Karjaluoto, H. (2005). Factors influencing consumers' willingness to accept mobile advertising: a conceptual model. *International Journal of Mobile Communications, 3*(3), 197-213.

Ledermann, S. (1956). Alcool, Alcoolisme, Alcoolisation, Vol 1 (presses Universitaires de France, Paris.

Lester, D. (1994). Access to gambling opportunities and compulsive gambling. *The International Journal of the Addictions, 29*(12), 1611-1616.

Lewis, G.J., & Stewart, N. (2003). The measurement of environmental performance: An application of Ashby's law. *Systems Research and Behavioral Science, 20,* 31-52.

Love, T., & Cooper, T. (2007). Complex built-environment design: Four extensions to Ashby. *Kybernetes,* 36, *1422-1435.*

Luckins, T. (2008). 'Satan finds some mischief'? Drinkers' response to the six o'clock closing of pubs in Australia, 1910s – 1930s. *Journal of Australian Studies*, *32*(3), 295-307.

Lund, I. (2008). The population mean and the proportion of frequent gamblers: Is the theory of total consumption valid for gambling? *Journal of Gambling Studies, 24*, 247-256.

Manning, W.G. , Blumberg, L., & Moulton, L.H. (1995). The demand for alcohol: The differential response to price. *Journal of Health Economics, 14*, 123-148.

May, H., & Hearn, G. (2005). The mobile phone as media. *International Journal of Cultural Studies, 8*(2), 195-211.

McLaughlin, K.L., & Harrison-Stewart, A.J. (1992). The effect of a temporary period of relaxed licensing laws on the alcohol consumption of young male drinkers. *The International Journal of the Addictions, 27,*(4), 409-423.

Media release, (2009). New National Broadband Network. *Office of the Prime Minister of Australia*. 7 April 2009. Retrieved 11 June, 2009 from http://www.pm.gov.au/media/Release/2009/media_release_0903.cfm

Neal, M. (2005). "I lose, but that's not the point": Situated economic and social rationalities in horserace gambling. *Leisure Studies, 24*(3), 291-310.

Nielsen, J. (2000). *Designing web usability.* Indianapolis: New Riders Publishing.

Northridge, D.B., McMurray, J., & Lawson, A.A.H. (1986). Association between liberalisation of Scotland's liquor licensing laws and admissions for self poisoning in West Fife. *British Medical Journal 293,* 1466-1468.

Norstrom, T., & Skog, O. (2005). Saturday opening of alcohol retail shops in Sweeden: an experiment in two phases. *Addiction, 100,* 767-776.

O'Hara, J. (1988). *A mug's game: A history of gaming & betting in Australia.* Kensington: NSWU Press.

Optus (1991). *Australia's first WAP service goes live.* Press release, 30 Nov 1999. Retrieved 11 June, 2009 from http://optus.com.au/portal/site/aboutoptus/menuitem.813c6f701cee5a14f0419f108c8a c7a0/?vgnextoid=1dd98336054f4010VgnVCM1000009fa87c0aRCRD&vgnextchann el=585cfaf924954010VgnVCM10000029a67c0aRCRD&vgnextfmt=default

Owens, M.D.jr. (2006). If you can't beat 'em, will they let you join? What American states can offer to attract internet gambling operators. *Gaming Law Review, 10*(1), 26-32.

Oztam, 2009. National Subscription Television. Australian Television Audience Measurement Universe Estimate Quarter 2. Retrieved 15 June, 2009 from http://www.oztam.com.au/pdf/TV_ratings/subscriptionTV_UE2009.pdf

Parke, A., & Griffiths, M.D. (2004). Why internet gambling prohibition will ultimately fail. *Gambling Law Review, 8*(5), 295-299.

Peters, B. (2008). Subscription Television in Australia. Screen Australia. August. Retrieved 15 June, 2009 from http://www.afc.gov.au/gtp/wptvanalysis.html

Phillips, F., & Tuladhar, S.D. (2000). Measuring organizational flexibility: An exploration and general model. *Technical Forecasting and Social Change, 64,* 23-38.

Phillips, J.G., Butt, S., & Blaszczynski, A. (2006). Personality and self-reported use of mobile phones for games. *CyberPsychology & Behavior, 9*(6), 753-758.

Phillips, J.G., Jory, M.K., Wijenayake, L. & Hii, P. (2010). Lectures and information communication technology: Psychological factors influencing user acceptance and usability. In. A. Ragusa (Ed.), *Interaction in Communication Technologies & Virtual Learning Environments: Human Factors* (pp. 246-268). IGI Global.

Porter, G. (1999). Trade competition and pollution standards" "race to the bottom" or "stuck at the bottom". *The Journal of Environment & Development, 8,* 133-151.

Productivity Commission. (1999). *Australia's gambling industries, Report No. 10*. Canberra: AusInfo. Accessed via http://www.pc.gov.au/ on 10/12/08.

Ramsay, R. (2007). SCE Australia boss on the 40GB PS3. Cnet Australia. 10 October. Retrieved 18 June, 2009 from http://m.cnet.com.au/games/339282711.htm

Reuter, P. (1983). *Disorganized Crime: The economics of the visible hand.* Cambridge: MIT Press.

Reynolds, R.I., Holder, H.D., & Gruenewald, P.J. (1997). Community prevention and alcohol retail access. *Addiction, 92*(Supp. 3), S261-272.

Richards, D. (2009). Are Sony PS3 Sales Numbers Flaky ? Smarthouse. 6 February. Retrieved 18 June, 2009 from http://www.smarthouse.com.au/Gaming/Industry/U5C7T9G5

Richtel, M. (2004). W.T.O. explains ruling against U.S. internet gambling ban. [Downloaded 29th April 2009 from http://query.nytimes.com/gst/fullpage.html?res=9B0DE2D91E3CF932A25752C1A96 29C8B63&scp=2&sq=WTO%20gambling%20carribean&st=cse]

Rivlin, G. (2007). Gambling dispute with a tiny country puts U.S. in a bind. [downloaded 29th April 2009 from http://www.nytimes.com/2007/08/23/business/worldbusiness/23gamble.html?scp=12 &sq=WTO%20gambling%20carribean&st=cse]

Room, R. (2005). The wheel of fortune: Cycles and reactions in gambling policies. *Addiction, 100,* 1226-1239.

Room, R., Turner, N.E., & Ialomiteanu, A. (1999). Community effects of the opening of the Niagara casino. *Addiction, 94*(10), 1449-1466.

Rose, G. (1985). Sick individuals and sick populations. *International Journal of Epidemiology, 14*(1), 32-38.

Rose, G., & Day, S. (1990). The population mean predicts the number of deviant individuals. *British Medical Journal, 301*, 1031-1034.

Rosen, L.D., Cheever, N.A., & Carrier, L.M. (2008). The association of parenting style and child age with parental limit setting and adolescent MySpace behavior. *Journal of Applied Developmental Psychology, 29*, 459-471.

Rush, B.R., Gliksman, L., & Brook, R. (1986). Alcohol availability, alcohol consumption and alcohol-related damage. I. The distribution of consumption model. *Journal of Studies on Alcohol, 47,* 1-10.

Rush, B., Veldhuizen, S., & Adlaf, E. (2007). Mapping the prevalence of problem gambling and its association with treatment accessibility and proximity to gambling venues. *Journal of Gambling Issues, 20,* 193-214.

Saffer, H. (1991) Alcohol advertising bans and alcohol abuse: an international perspective. *Journal of Health Economics*, 10, 65-79.

Scoolidge, P.J. (2006). Gambling blindfolded: The case for a regulated domain for gambling sites. *Gaming Law Review, 10*(3), 252-265.

Sévigny, S., Cloutier, M., Pelletier, M-F., & Ladouceur, R. (2005). Internet gambling: Misleading payout rates during the "demo" period. *Computers in Human Behavior, 21*, 153-158.

Shaffer, H.J. (2005). From disabling to enabling the public interest: natural transitions from gambling exposure to adaptation and self-regulation. *Addiction, 100,* 1226-1239.

Shaffer, H.J., Hall, M.N., & Vander Bilt, J. (1999). Estimating the prevalence of disordered gambling behavior in the United States and Canada: A research synthesis. *American Journal of Public Health, 89*(9), 1369-1376.

Scheeres, J. (2001). Nazi sellers just moving on. [downloaded 24th April 2009 from http://www.wired.com/techbiz/media/news/2001/05/43610]

Smart, R.G., & Mann, R.E. (1987). Large decreases in alcohol-related problems following a slight reduction in alcohol consumption in Ontario 1975-83. *British Journal of Addiction, 82,* 285-291.

Smeaton, M., & Griffiths, M.D. (2004). Internet gambling and social responsibility: an exploratory study. *CyberPsychology & Behavior, 7*, 49-57.

Smith, D.I. (1988). Effect on traffic accidents of introducing Sunday alcohol sakes in Brisbane, Australia. *International Journal of Addictions, 23*(10), 1091-1099.

Smith, D.I. (1986). Comparison of patrons of hotels with early opening and standard hours. *The International Journal of the Addictions, 21*(2), 155-163.

Souza, A. (2006). Re-conceptualizing the mobile phone - from telephone to collective interfaces. *Australian Journal of Emerging Technologies and Society, 4*(2), 108-127.

Stockwell, T., & Crosbie, D. (2001). Supply and demand for alcohol in Australia: relationships between industry structures, regulation and the marketplace. *International Journal of Drug Policy, 12,* 139-152.

Tanner, G. (2006). *Television digitalisation: Market trends and regulatory developments.* Presentation to the Australian Interactive Media Association. Future of TV Forum

Teesson, M., Hall, W., Lynskey, M., & Degenhardt, L. (2000). Alcohol-and drug-use disorders in Australia: Implications of the national survey of mental health and wellbeing. *Australian and New Zealand Journal of Psychiatry, 34*(2), 206-213.

Toneguzzo, S.J. (1995). *The internet: Entrepreneur's dream or regulator's nightmare?* In J.O'Connor (Ed.), High stakes in the nineties. Proceedings of the 6th national conference of the National Association for Gambling Studies, Fremantle 28-30th September, 1995.

Toneguzzo, S.J. (2000). *Technologies for the regulation of online gambling.* 3rd National Gambling Conference, Australian Institute of Criminology and Australian Institute of Gambling Research, Sydney.

US-FCC, 2009. *What is broadband*? Site reviewed/updated 27/5/09. Retrieved 12 June, 2009 from http://www.fcc.gov/cgb/broadband.html

van Leuveren, L. (2007). eGames 07: PlayStation 3 sales pass 100,000. Palgn. 16 November. Retrieved 15 June, 2009 from http://palgn.com.au/playstation-3/9520/egames-07-playstation-3-sales-pass-100-000/

Volberg, R.A. (1994). The prevalence and demographics of pathological gamblers: Implications for public health. *American Journal of Public Health, 84* (2), 237-241.

Wagenaar, A.C., Finnegan, J.R., Wolfson, M., Anstine, P.S., Williams, C.L., & Perry, C.L. (1993). Youth alcohol access: Where and how adolescents obtain alcoholic beverages. *Public Health Report, 108,* 459-464

Walker, D.M. (1999). Legalized casino gambling and the export base theory of economic growth. *Gaming Law Review, 3*, 157-163.

Wang, R., Bianchi, S.M., & Raley, S.B. (2005). Teenagers' internet use and family rules: A research note. *Journal of Marriage and Family, 67*, 1249-1258.

Watson, S., Liddell, P.Jr., Moore, R.S., and Eshee, W.D. Jr. (2004). The legalisation of internet gambling: A consumer protection perspective. *Journal of Public Policy & Marketing, 23*(2), 209-213.

Wei, R. (2008). The convergent mobile telephone: An emerging bridging medium. In A.C. Harper & R.V. Buress (Eds.), *Mobile telephones: Networks, applications and performance* (pp. 3-7). New York: Nova Science Publishers.

Welte, J.W., Barnes, G.M., Wieczorek, W.F., Tidwell, M.O., & Hoffman, J.H. (2007). Type of gambling and availability as risk factors for problem gambling: A Tobit regression analysis by age and gender. *International Gambling Studies, 7*(2), 183-198.

Welte, J.W., Wieczorek, W.F., Barnes, G.M., Tidwell, M., & Hoffman, J.H. (2004). The relationship of ecological and geographic factors to gambling behavior and pathology. *Journal of Gambling Studies, 20*(4), 405-423.

Wood, R.T., Griffiths, M.D., & Parke, J. (2007). Acquisition, Development, and Maintenance of Online poker playing in a student sample. *CyberPsychology & Behavior, 10,* 354-361.

Wood, R.T., Williams, R.J., & Lawton, P.K. (2007). Why do internet gamblers prefer online versus land-based venues? Some preliminary findings and implications. *Journal of Gambling Issues, 20,* 235-252.

3. The Stake

As electronic gaming machines have been suggested to generate higher levels of problem gambling (Dowling, Smith, & Thomas, 2005), jurisdictions have sought to restrict access and control the numbers of these devices (Eadington, 1995). With the development of the internet, there is the potential for gambling to occur on personal computers, any other web capable device (e.g. mobile phones, fridges, *Playstations*), and interactive television. For such reasons some experts have argued that prohibition is futile (Eadington, 2004; Owens, 2006; Parke & Griffiths, 2004; Watson, Liddell, Moore, & Eshee, 2004). Given the ubiquity of personal computing devices, there is a need to understand the nature of the likely consumers of gambling products and the factors that might influence their wagering behaviour.

During the initial growth of the internet there were concerns that a proportion of the community would not have access to the technology. It had been suggested that lower socioeconomic status or poorer education would prevent access and create a "digital divide" between those that used the internet and those that do not (the technologically disenfranchised) (Katsikides, 1998). Due to the efforts of organisations such as the W3C (the governing body for the World Wide Web), guidelines for the design of the web have been produced that are intended to ensure access to individuals regardless of computing device or ability (http://www.w3.org/TR/WCAG/).

The increasing availability and computing power of mobile phones (Souza, 2006) means that this threatened technological disenfranchisement is unlikely. Nevertheless, there are likely to be some restrictions imposed upon populations, locations and times when people can place bets. For instance employers have formulated policies on the use of the internet within the workplace (Young & Case, 2004) and attempt to restrict the nature of websites that employees can access (Case & Young, 2002) such as online gaming. However, outside of workplace computers and upon mobile phones there are likely to be fewer restrictions and greater access to electronic gaming, hence there is a need to understand the likely segments of the population who will be using these technologies.

3.1 Predispositions towards technology use

3.1.1 Age

Age has been seen as a major determinant of the use of different types of technology (e.g., Charness & Bosman, 1992). Hence it is probable that the likely users of newer technologies will be younger individuals. The differences between younger and older individuals and their relationship to technology has been emphasised by Prensky (2001a,b). Indeed Prensky (2001a,b) argued that there are qualitative differences in the language, interests and abilities of computer users, with younger users being described as "digital natives", whereas older users were described as "digital immigrants". In particular Prensky (2001a,b) argued that younger cohorts were computer game generations that responded better to information presented within computer game formats.

There is some research to support Prensky's position. Studies have found that increasing age is negatively correlated with Internet use (Kraut et al., 1996; Kubeck, Miller-Albercht & Murphy, 1999) and the elderly are reported to participate less in the digital

economy (see Arch, 2008 and http://www.acma.gov.au/WEB/STANDARD/pc=PC_311716). Even in studies where Internet access and help services were readily available, older adults have been found to use the Internet less frequently (Kraut et al., 1998). In addition, younger individuals are also more likely to use mobile phones (Bianchi & Phillips, 2005; Butt & Phillips, 2008).

Internet use and access decreases with age in Australia (ABS, 2007) as does mobile phone ownership (Wajcman, Bittman, Jones, Johnstone, & Brown, 2007). Nevertheless, as mobile phone ownership is higher than internet access, Boyera (2006) argued that the mobile phone would be a promising tool that was going to bridge any digital divide.

3.1.2 Social isolation

Researchers initially characterised individuals that used computers more often as withdrawn and isolated (Shotton, 1991). Shotton (1991) interviewed 75 individuals that were dependent upon their computers. Individuals that were more dependent upon computers were highly educated and interviews suggested that they were generally less social than their peers. Individuals that were dependent upon computers preferred their own company to that of others, were object oriented and engaged in more non-social hobbies and interests, most of which were in the area of science and technology. They were also characterized by a "constant need for positive, intellectual stimulation" (Shotton, 1991, p. 225).

Such early case studies (Shotton, 1991) were interesting as there is currently a need to determine segments of the community that are liable to be interested in online gaming, and the individuals that might be at potential risk of developing problems. However, the situation has been complex, with a curious need to distinguish between socially withdrawn users of the internet and the more active players of computer games (Griffiths, 1997; 2000; Young, 1996). For instance, some authors have suggested that anything that is exciting, such as the internet, can be addictive (Shaffer, 1996). However sensation seeking is not necessarily a predictor of gambling behaviour (Parke, Griffiths, & Irwing, 2004). Instead it is likely that the internet affords access to the objects of interest (Griffiths, 1996; Griffiths & Barnes, 2008; Smeaton & Griffiths, 2004).

Subsequent quantitative studies discussed similar issues, namely whether technology use was greater in the withdrawn and socially isolated or higher in those seeking excitement. There has been some discussion as to whether the Internet is used by lonely people to pursue solitary activities. Kraut et al. (1998) had suggested that time spent on the Internet meant less time spent on interactions with other people and therefore promoted loneliness. Others have observed that people who are already lonely spend more time on the Internet (Amichai-Hamburger & Ben-Artzi, 2003) and were more likely to use the Internet to modulate their moods (Morahan-Martin & Schumacher, 2003).

The reasons given for engaging in internet gambling also suggest a predisposition towards social isolation. Wood, Williams and Lawton (2007) conducted a study of 1920 internet gamblers. Respondents reported preferring internet gambling for a variety of reasons: a) the relative convenience (12.9%), comfort (11.7%), and ease (12.2%) of internet gambling; b) an aversion to the atmosphere (i.e. crowds 4.7%; noise 4.1%; smoke, 3.9%) and clientele of land-based venues (5.1%); c) a preference for the pace (high speed 3.8%; leisurely pace 3.1%) and nature of online game-play; and d) the potential for higher wins (1.8%) and lower overall expenditures (3.0%) when gambling online. Some of the specific

reasons given for preferring internet gambling were a dislike of crowds, noise and casino atmosphere. Nevertheless as can be seen from the above percentages, convenience, ease and comfort were some of the more common reasons given for internet gambling. A percentage of players cited a disability (0.4%) as a reason for preferring internet gambling.

In contrast to the stated dislike of the casino environment found by Wood et al's (2007) participants, other studies cite the benefits of getting out of the house. Thomas, Allen and Phillips (2008) considered the reasons people gave for visiting gaming venues from 232 females and 132 males. Exploratory factor analysis extracted three motivational factors. People gambled on EGMs to escape from stresses. The other factors were the accessibility of the gaming venue, and the social environment. The factors associated with "gambling to escape" (r=0.55) and "accessibility" (r=0.50) had larger positive correlations with the frequency of EGM gambling. Reasons for gambling such as the social environment (r=0.18) correlated less well with frequency of gambling.

There is evidence to support the suggestion that the internet was more likely to be used by the socially isolated. For example, at one stage the deaf or disabled were proportionately amongst the greatest users of the internet (Nielsen, 2000). Nevertheless, such observations need to be viewed in light of other findings addressing specific applications. For instance extroverts tend to use functions of the internet such as email more often (Wyatt & Phillips, 2005). In addition, extroverts are more likely to use communication technologies such as mobile phones more often (Bianchi & Phillips, 2005: Butt & Phillips, 2008), and extroverts are more likely to play games with their mobile phones (Phillips, Butt, & Blaszczynski, 2006), suggesting that a proportion use technology for purposes of stimulation (Shaffer, 1996).

These seemingly conflicting observations can be better understood by referring to a further study by Kraut et al. (2002). In a replication of the earlier HomeNet study, Kraut et al. (2002) performed a longitudinal study of 406 participants from 216 households. Those individuals who were more outgoing and sociable in their outlook (namely extroverts) exhibited more community involvement with higher levels of Internet use. Those individuals who were less outgoing and sociable in their outlook (namely introverts) reported greater levels of loneliness with higher levels of Internet use. In each case these *technologies appear to be tools that afford access to pre-existing interests* (Griffiths, 1996; Griffiths, 2007; Griffiths & Barnes, 2008).

Availability and accessibility appear to influence consumers' ability to approach the gambling task (Delfabbro, 2008). The relative ease of access seems to be a factor influencing consumer choice. Restricting the numbers of EGMs as was done in South Australia can make it harder to find a machine, but people still gambled (Delfabbro, 2008). However convenience to the consumer appears to be a major determinant of choice for either online gambling (Wood et al., 2007) or gaming venue (Thomas et al., 2008). The choice between gambling online or at a gaming venue seems to be more a function of whether people want to get out of the house.

3.2 Online versus Offline differences

Given early suggestions that people that used technology more were more withdrawn, it is important to determine the nature of differences between populations sampled "online" and "offline". The internet and diffusion of personal computers has made an impact on the

conduct of psychological research changing for example how data are collected and stored (Kraut et al., 2004). Web-based studies and questionnaires have become increasingly popular and have been used in many different areas of research (Shih & Fan, 2008). Some of the benefits of collecting online data are lower costs (both monetary and time wise for researchers) (Kaplowitz et al., 2004), access to more heterogeneous samples (Pittenger, 2003); the chance to observe new social phenomena (e.g. online chat groups) or very large social group interactions (Kraut et al., 2004). One major advantage of internet-based research is that it can provide access to samples previously out of reach of psychology researchers or easier access to at risk/clinical populations (Gosling et al., 2004) including problem gamblers and those people who may have problems with new forms of technology.

In addition to these features, the internet has allowed researchers to have access to other types of data including tracking a participant's browsing behaviour on-line and tracking the time taken to complete tasks or individual questions (Kraut et al., 2004). Web-based survey research also has other advantages over more traditional paper-based forms in that it has the opportunity to be more flexible and to tailor what questions are asked to a participant based on their previous responses; and less transactional human error once responses are input by participants (Kraut et al., 2004). One limitation with this is however is that if participants make a mistake, they also may be less likely to notice their error (*Section 5 discusses e-voting and fraud*).

Some comparative studies have been undertaken in order to compare different issues associated with online and offline samples (i.e. group differences, validity, demographics of participants). Shih and Fan (2008) note that comparative studies need to sample the same population in the same time frame and populations need to be contactable either by phone or web in order to make meaningful comparisons.

Huang (2006) considered whether participants would respond differently to questions in online versus an offline environment and examined the convergent validity and social desirability between the two groups. Two hundred students from Taiwan completed a survey that contained demographic information; a behaviour scale; an attitude scale; adaptive questions; sensitive questions about the use of pirated software; and open-form questions. The response rate was 85% for the printed survey and 63% for the web-based survey. The authors found no differences between the groups in key demographic variables including gender (60% female in print; 63.5% female in internet), no differences in missing data between the two formats and no differences in the attitude scale or sensitive questions. The results from this study suggest that the two forms of data collection are equivalent. This finding was supported by field research which looked at responses of 4,909 (4,244 web-based and 665 paper-based) questionnaires given out in a multi-national corporation that spanned 50 countries (Cole et al., 2006). Factor Analysis was used to examine the equivalence of online versus offline responses to a questionnaire on transformational leadership. Equivalence was found in psychometric properties and Cole et al. (2006) suggested that there are minimal measurement differences for psychometrically sound tools when data are collected on the internet as opposed to more traditional paper-based forms.

Other studies have also found that web-based formats have lower response rates when compared to more traditional mail surveys. Converse et al. (2008) looked at the medium provided (paper-based versus web-based) upon response rates and non-deliverable rates. Participants for this study were 1,500 teachers. The overall response rate was 76.3% and there was a significant difference in initial response rates, with the mail-based format having

80.7% respondents complete the survey compared with only 41.8% of the online participants. In addition, the non-deliverable rates were also compared and found to be 4.1% for mail and 16.1% for the web. Similarly to the Huang (2006) study, analysis of demographic details on the teachers (gender, ethnicity, and years of education experience) found no significant differences.

A recently completed meta-analysis compared 39 studies published within 1998-2008 that directly compared mail and web-based surveys (Shih & Fan, 2008). Mail surveys had higher response rates (45 vs. 34%), but there was a large amount of variability in the studies that were analysed with the range up to 54% higher in mail responses in one study compared with web responses, and 23% lower in another. The meta-analysis identified a standard deviation of 0.19 in response rates which is quite high (Shih & Fan, 2008). In examining factors accounting for the differences in response rate, the type of population accounted for 27% of variance across studies. It was found that college populations were more likely to complete web-based surveys and that professionals' and the general public's use of the web to complete surveys was lower (Shih & Fan, 2008). This may be because the younger college groups were more technologically knowledgeable and had readier access to the internet on campuses. In addition to population differences, follow up reminders (accounted for 10% variance), significantly increased the response rates in the mail forms only (Shih & Fan, 2008). This difference may be explained as reminders sent via e-mail are more likely to be treated as SPAM and therefore less effective than paper-based reminders.

Kaplowitz et al. (2004) have argued that any difference between mail and e-mail response rates may be because less time and attention has been devoted to developing motivational tools or reminders for online questionnaires. Kaplowitz et al. (2004) looked at factors that might influence survey responses. Kaplowitz et al. (2004) varied the methods of delivery (mail versus email) and varied whether reminders were provided to participants in the form of pre-survey and post survey postcards. The survey was delivered in a variety of methods to 19,980 students (undergraduates and postgraduates). The authors found a significant difference in the age of respondents in the web-based groups (M = 24.14 yrs) compared to the mail-based group (M = 30.55 yrs), but that this did not cause differences in interpretation of the main substantive points of the survey. In addition, there were no differences in the proportion of males between the two groups, their distance away from campus or academic levels. As has been observed by others, Kaplowitz et al. (2004) found differences in the response rates between groups in participants delivered a survey via mail or a web-link. The highest response rate in this study occurred in the mail group which accounted for about 35% of total responses. However, a reminder postcard had a positive effect on response rates for those who received the web-link and response rates became comparable to the mail group. This effect was diminished however if a pre-survey postcard was delivered to participants before they received the e-mail with a web-link to the survey. These results indicate that either a pre-survey or post-survey postcard delivered to participants about a web-survey can increase the response rate, and still be advantageous over a mail-out survey because it costs less to print and mail out post-cards (under $2 per response) compared to printing and mailing the whole survey (more than $10 per response).

While response rates in internet compared with more traditional paper-based studies may differ, Internet-based research with 'hidden' populations has become increasingly popular because respondent anonymity may encourage response rates and may decrease social desirability when compared with paper-based forms (Bowen et al., 2008). However, other problems are associated with internet surveys including the possibility for participants

to provide multiple submissions which may bias data. Bowen et al. (2008) investigated methods for identifying multiple submissions in a 3-session internet intervention with pre and post test questionnaires in a sample of men who have sex with men. They found 1,273 unique responses and divided up multiple submissions into infrequent (2-5, 36% of multiple responses); persistent (6-10, 13% of the multiple submissions), very persistent (11-30, 17% of the multiple submissions) and hackers (greater than 30, 34% of the multiple submissions). IP addresses, usernames, passwords were the most useful tools for identifying multiple responses. However a limitation with this tracking is that if a survey is completed from a public location or a home containing two or more eligible participants then IP address alone is not sufficient as it may delete some respondents (Bowen et al., 2008). In addition, his study found that hackers often varied their IP address to avoid detection. Even though hackers changed their IP addresses, they did not vary their IP addresses by much (i.e. changed last couple of numbers). Hence checking IP addresses for small variations could potentially assist in identifying hackers (Bowen et al., 2008). Logistic regression also identified that incentives played a role in multiple submissions, because the number of multiple submissions was 6 times greater (17.4% vs. 2.9%) when people were eligible for a payment. This replicates the work by Gosling et al. (2004) who found that only 3.4% of responses in a large scale personality study were repeat responders, Other methods for detecting erroneous responses have been suggested by Gosling et al. (2004) including testing for non-motivation by looking for long strings of the same responses or by scale reliabilities.

Gosling et al. (2004) evaluated six preconceptions that have been raised as likely limitations of internet-based questionnaires (see Table 3.1 from Gosling et al, 2004). In order to do this, Gosling et al. (2004) examined differences in the sample demographics and in personality test results that were conducted online ($n = 361,703$) compared to those from the top journal in the field of personality and social psychology (Journal of Personality and Social Psychology) (all traditional samples, n = 102, 959; correlational studies only n =75,363). They found that by using an online sample, the gender discrepancy normally noted in psychology research was much smaller compared to the traditional sample (57% females in internet samples, vs. 71% female journal sample). In addition, online studies were likely to have less of a race discrepancy and an older mean age (24.3 internet vs. 22.9 traditional studies). Gosling et al. (2004) argued that while the internet sample may not reflect the general population at large, internet samples were more diverse and representative than even the top journal in the field with respect to some key demographic variables including gender, socioeconomic status, location and age. In addition, Gosling argued that the criticism that online samples are non-random (see for example Beddows, 2008) is unfounded because the overwhelming majority of traditional psychology studies make no effort to use true random sampling. In the context of undertaking internet-based research, Gosling et al. (2004) argue that generalisability is more important than the representativeness of the sample, and that researchers should choose the best method for their target population. Therefore, clinical populations including problem gamblers or those with problems with technology may better be recruited and studied via the net. Also, Gosling et al. (2004) stated that the internet may provide decreased social desirability and clearer responses from such self-selected internet samples who may feel more comfortable in disclosing personal information.

Table 3.1. Six preconceptions about internet methods (from Gosling et al., 2004).

Table
Six Preconceptions About Internet Methods

Preconception	Finding
1. Internet samples are not demographically diverse (e.g., Krantz & Dalal, 2000).	Mixed. Internet samples are more diverse than traditional samples in many domains (e.g., gender), though they are not completely representative of the population.
2. Internet samples are maladjusted, socially isolated, or depressed (e.g., Kraut et al., 1998).	Myth. Internet users do not differ from nonusers on markers of adjustment and depression.
3. Internet data do not generalize across presentation formats (e.g., Azar, 2000).	Myth. Internet findings replicated across two presentation formats of the Big Five Inventory.
4. Internet participants are unmotivated (e.g., Buchanan, 2000).	Myth. Internet methods provide means for motivating participants (e.g., feedback).
5. Internet data are compromised by anonymity of participants (e.g., Skitka & Sargis, in press).	Fact. However, Internet researchers can take steps to eliminate repeat responders.
6. Internet-based findings differ from those obtained with other methods (e.g., Krantz & Dalal, 2000).	Myth? Evidence so far suggests that Internet-based findings are consistent with findings based on traditional methods (e.g., on self-esteem, personality), but more data are needed.

There are a number of ethical issues that need to be considered when conducting research on the internet including: preservation of privacy, informed consent, deception of participants and de-briefing and research methodology (Pittenger, 2003; Skitka & Sargis, 2006). Pittenger (2003) stated that in many instances the difference in location where the research is conducted (online versus offline) is minimal and that using the internet to conduct behavioural research offers no extra ethical challenges to conducting it in a laboratory. However there are other special concerns that may need to be addressed (see Pittenger, 2003). The internet is a public forum, and therefore researchers must consider:

Privacy and Confidentiality: Any collected data should not able to be accessed by hackers, therefore data storage, transferring of files, encryption of files are necessary to protect participant responses.

Informed Consent: The researcher may not know who is participating creating an ethical dilemma (Pittenger, 2003). Children may access the internet and pretend to be their parents, and with adults there is no guarantee they will read informed consent forms or understand their responsibilities in partaking in the research.

In examining this particular question, Varnhagen et al. (2005) examined participant's reading of and recall of online informed consent versus paper-based versions. In their experiment they also varied the style of the format presented with the consent document

being either 'scrollable' or presented 'page by page'. One hundred undergraduate psychology students were participants for this study and data were analysed using a 2-way ANOVA (medium – computer versus paper) and presentation format (long versus page by page). Varnhagen et al. (2005) found an effect for medium, with participants taking longer to read the document online versus on paper and an interaction between medium and presentation format. Format (long versus page by page) had no effect on computer, but it did offline. They also found that recall was very low for all conditions, with less than 10% of the ideas from the informed consent form being recorded. However, the page format had better recall than the scroll version ($p<.01$), with participants recalling one 'unit idea' more in this condition compared with the scroll version. Interestingly, the most commonly recalled events were the risks in participating in the study. In exploring reasons as to why the participants did not read the form thoroughly: 47% said because they are mostly the same as other documents they had read previously; 8% said because of time needed to read it thoroughly and 15% said *because they trusted the psychology department to engage in ethical research and activities*. Nevertheless, the present study demonstrated that many participants do not read the informed consent form no matter what format it is provided in.

In summary, research comparing online to offline studies has demonstrated equivalence in a number of areas including demographics and psychological inventory scores. Participants online may be younger, but the internet provides access to a larger number of participants, and is more likely to gain responses from clinical or at risk populations. Hence conducting surveys online is a useful tool for gathering data if proper ethical issues such as privacy, confidentiality and data screening for multiple responses are adhered to.

3.3 The digital divide and gambling

Although there were initial concerns that there would be differences between "offline" and "online" populations, there is evidence that any differences that might have existed are disappearing. Organisations such as the W3C have worked to reduce barriers to digital content. Indeed the mobile phone is touted as the tool that will put computing in everybody's hands. Although there were suggestions that technology was the province of the socially withdrawn, evidence now suggests that technology affords access to the objects of interest (Griffiths, 1996; Griffiths, 2007). Even if there are barriers that technologically disenfranchise segments of the community (e.g. older adults, gamblers), these barriers are lowering. The increasing number of less technically minded of users, coupled with increases in the amounts of content on the internet has created a need for methods of navigating and locating content of interest for users. Hence the next section will address developments intended to assist consumers to find material that they are interested in.

3.4 Recommenders

The recent surge in use of the Internet has lead to a case of 'information overload' for many. To help sift through the vast amount of information available on the world-wide-web, recommender agents have been developed. Recommender systems implement complex algorithms to learn the behaviours and preferences of users and then provide recommendations of relevant products or services to the user. Recommender agents are primarily used on the internet but are also being developed for use with mobile devices, such as mobile phones, and even to help grocery shopping (http://www.berkeleydailyplanet.comissue2002-11-11article16019headline=New-shopping-technology-could-breed-supermarket-discrimination). In other words these systems tend to

track or profile the preferences of users and make suggestions as to their future purchases. Hence these systems may act in the future as electronic "touts" or "spruikers". As the community is already being deluged by Spam, there is a need to understand how recommender systems operate.

3.4.1 Internet-based Recommenders

One of the most popular and well-known recommender systems on the intenet is Amazon.com[TM] (www.amazon.com) which recommends products, such as books or DVDs, based on the user's search terms and purchase history. Recommenders, such as those used by Amazon.com[TM] are popular examples of e-Commerce; buying and selling products over electronic systems, such as the internet.

Recommender systems differ between websites and platforms and the algorithms they implement. The underlying algorithms determine how information about the user is stored and how this information is used to give recommendations. The next section explains in more detail each of the differences between recommenders and discusses some limitations of each approach.

Firstly, recommenders need information about the user to give accurate suggestions. A recommender can not give good recommendations from the moment a user creates an account without an initial profile of the user (Montaner et al., 2003). A manual initial profile can be created which involves asking the user to enter keywords or topics describing their interests. Another way of creating an initial profile involves 'stereotyping' users based on their location, age, gender and occupation. Because users are often pressed for time or hesitant to record personal details on a website, initial profiles are generally inaccurate. Sketchy initial profiles can lead to inaccurate recommendations in the future.

Information about the user (including any from the initial profile) must be stored in a *user profile*. There are a number of ways to represent the user profile, the most popular being history based models. In these models, the user's previous activity such as browser history, product purchases and search terms are recorded. Other popular ways to organise and represent the user profile are semantic networks, vector space models, neural networks, a ratings matrix or decision trees (Montaner et al., 2003).

Once information is stored in the user profile, the recommender system must learn the user's likes, dislikes and behaviours so that it is able to give good recommendations. This is known as *profile learning techniques* and is based on research of Artificial Intelligence systems. These techniques generally involve analysing the frequency between search terms and item relevance to learn the user's preferences. Some recommender systems do not use learning profile techniques as they only record information directly recorded from the user. For example, Amazon.com[TM] keeps a list of purchases as the user profile and does not need to learn what the user likes as it is inferred from the user's purchase history.

Another way recommenders differ is the way the user profile changes over time. New user interests need to be added and old interests need to be forgotten. The user profile should be continually updated to give the best recommendations. One way of updating the user profile is by receiving feedback as to the relevance of recommendations from the user. Feedback can be positive or negative and can be given explicitly or implicitly. Implicit information is gathered without the user's awareness. Implicit techniques could involve tracking the user's web-browsing history, analysing which links the user has clicked on, or

recording how long a user stays on each webpage to learn which items the user likes. For example, in a music recommending program such as Last.Fm[TM] (www.lastfm.com) the number of minutes an artist is listened to could determine how much they are liked. Directly entering detail into a recommender is referred to as *explicit* information. Some recommender systems ask the user explicitly whether they like or dislike an item or to rate the item on a scale. Explicit information tends to be more accurate than implicit information as it is less subjective. Most recommenders use a combination of both explicit and implicit information and this increases the accuracy of recommendations (Montaner et al., 2003).

Once the initial profile has been generated and the user profile created and maintained, the recommender agent gives recommendations based on the available information. The most popular techniques to sort through the collected information are *collaborative filtering* and *content-based filtering*. Collaborative filtering works by analysing item ratings between similar groups of people (Bradley et al., 2004). One of the problems with collaborative filtering is if a new item is introduced into the system it will not be recommended because no one has rated it before. Content-based filtering, on the other hand, analyses the link between the user and the description of the item the user is usually interested in (Montaner et al., 2003). The problem with this approach is the recommender system will not suggest items 'outside the square' that the user had not previously considered. An accurate recommender uses an algorithm that combines the collaborative and content filtering approach, known as a hybrid approach.

One of the major problems with a recommender is they appear essentially as a 'black box'. This means that no information is given to the user about how the recommendations are made. One particular problem is the recommender may use implicit information without the user's awareness which can lead to privacy issues. A user may not want to use a recommender if they knew their browser history, email inbox use or search key terms are being recorded and kept in a database.

Another limitation of recommender systems is the trustworthiness of the system. Users must trust that personal information is not, accidently or deliberately, given to others. Furthermore, recommenders must be reliable. Companies implementing recommenders on their site can promote their product by manipulating recommendations. Amazon.com[TM] admitted to using fake recommendations to drive up sales of their new clothing store partners (Wingfield & Pereira, 2002). Furthermore, recommenders are vulnerable to users who create many accounts to drive up ratings of a product. This may be attempted because highly rated items are more likely to be recommended. However, researchers are currently developing measures to indicate whether a recommender system is trustworthy or not (see Sabater & Sierra, 2005).

Recommender systems can be costly to implement and hence the company's interest in developing them is questionable. In e-Commerce, recommender systems are implemented to increase sales on their website (Schafer et al., 1999). Sites such as Amazon.com[TM] increase sales by recommending similar products at checkout, increasing the average order size. Recommenders also instil loyalty in a customer – the user feels as if the site has an interest in them which leads to less shopping around. Another way to pay for the implementation of recommender systems is by targeted advertising. Targeted advertising is a technique whereby products or services are recommended given demographic or purchase history of the user. Some recommender systems already do this, for example, the internet search engine *Google*.com[TM] recommends products or services related to entered search terms.

This section has dealt with the specifications and limitations of recommender agents on the internet. Recommenders, however, are not just restricted to internet use. Recently, recommenders have begun to be developed for use on other platforms. One of the more exciting developments in this field is the introduction of recommender agents on mobile phones, smart phones, personal digital assistants (PDAs) and palm pilots. The next section will briefly describe some of the technologies being developed for recommender systems on mobile devices.

3.4.2 Mobile-based Recommenders

The increase in portable personal devices has caused companies to investigate the effectiveness of selling and buying through mobile devices, a domain of business referred to as m-Commerce (McManus & Scornavacco, 2005). Wireless platforms are especially of interest in mobile marketing because recommendations can be made instantaneously, become more personal as a mobile is not a shared device like a home computer and recommendations are not restricted to a wired network (McManus & Scornavacco, 2005). It should be noted that mobile recommenders differ from 'spam' text messages. Mobile recommenders require the user to create an account online and the user controls how and when they wish to receive recommendations.

Recommender systems are useful when sifting through large quantities of information and this is especially of interest on a mobile device. Mobile recommenders provide the opportunity for users to receive recommendations based on their location and to access recommendations wherever they are. As mobile devices typically have small displays and bandwidth limitations, it makes sense to only download the most relevant information on to the user's device (Woerndl et al., 2007). Recommender systems are being developed on smart phones that sift through information just like the internet based recommenders described earlier. Users input what they want to find, rate items they have used, connect to other similar users, and are given recommendations (Bradley et al, 2004), such as recommending mobile phone applications to download (Woerndl et al., 2007).

Using recommenders on portable devices can also add an interesting dimension to the development of the software. The location (where) and the context (doing what) of the user is now available. This adds information to the user profile and can increase the quality of recommendations (Yang et al., 2008). The problem faced by developers is integrating the location and context into recommender algorithms designed for the internet and running these applications on devices which have significantly less computation power and space available.

Mobile recommender systems differ in the way they make recommendations and how a user's location is monitored. Recommendations can be sent directly to the person's mobile device via SMS, MMS or Bluetooth, or the user can use their mobile device and explicitly request a recommendation of a product. The location of user can be determined by centralized or decentralized methods. Centralized methods use signals from the device beamed out to deployed receivers to determine the user's location. Decentralized methods, such as Global Positioning Service (GPS), involve the user receiving signals on their mobile device from beacons indicating the user's location (Yang et al., 2008). Recommender systems typically employ decentralized methods so that the user controls whether the application has access to their location. Applications using decentralized methods have been tested which send messages such as the location of nearby sale items (Yuan & Tsao, 2003)

and linking to nearby vendor's web-pages (Yang et al., 2008). Centralized methods have also been used to send messages as users walk past vendors that have a receiver in shop front (Aalto et al., 2004). Hence technologies are being developed that can determine: a consumer's interests; how much the consumer is worth; and offer inducements as the consumer approaches a point of sale.

This section has briefly outlined mobile recommenders. Mobile agents are useful because they are portable and can employ the person's location to add to the quality of recommendations given. Potential applications of this technology could be to *offer people an inducement as they near a gaming venue.*

3.4.3 Inappropriate or aggressive decision aids

Although decision aids primarily seek to influence consumer purchase, some are inappropriate and actually seek to force the consumer to take some sort of action. Whitworth (2005) argues that some pop-up windows are impolite as they preempt user choice. Many of the applications that delay computer start up and occupy computer memory are applications that consumers do not actually want. Hence Whitworth argues that applications that take over computers for their own uses could be considered selfish. Whitworth (2005) observes that such selfish or impolite applications tend to be disabled where possible, or otherwise tend to drive users away.

Nairn and Dew (2007) discussed the ethics of online advertising. The majority of designed commercial websites are primarily supported by advertising. However a proportion of this advertising (i.e. gambling, alcohol, pornography) is inappropriate (see Monaghan, Derevensky, & Sklar, 2008). Hence when using advertising to fund websites there needs to be some thought devoted to who will be the main users of the website (Austin, & Reed, 1999). Even when the website is not specifically directed at children, children may still be predominant users of such sites (e.g. general information sites like Wikipedia). Nairn and Dew (2007) argue that children have difficulty distinguishing between persuasive content and entertaining content.

More importantly some forms of content can be quite aggressive and attempt to force a consumer to follow a particular form of action. Aggressive pop-ups seek to force individuals to follow links or make purchases. For instance consumers in the USA took up a free movie download offer with Movieland (Turner, 2006). After a trial period, consumers were inundated with pop-ups that appeared at least hourly and subjected the consumer to a 40-second payment demand that could not be closed. The messages were generated by software installed on their computers that could not be easily removed. To stop these aggressive pop-ups, many frustrated consumers ultimately gave in and paid anywhere from $19.95 to nearly $100 for the service. Thousands of consumers in the USA complained to state attorneys, Federal Trade Commission, and the Better Business Bureau about these practices.

3.4.4 Advertisements and warnings

A variety of methods have been adopted to influence consumer behaviour online. Warnings and advertisements can be presented in a variety of ways. Banners can be located in a static location upon webpages, or the banners can be animated. Messages can also pop-up during ongoing activities.   The effect of these persuasive communications can be evaluated in a variety of ways (e.g. ratings, recall, click throughs) (Rosenkrans, 2007).

For both advertising and warnings, there is a concern that consumers will not recall messages (Burke, Hornof, Nilsen, & Gorman, 2005). As warnings and advertisements have differences in goals, there are likely to be differences between concern for any perceived intrusiveness of advertising (Edwards, Li, & Lee, 2002; Whitworth, 2005). A number of studies have addressed efficacy of online advertising. In major surveys of adult internet users Hrywna, Delnevo and Lewis (2007) reported the greatest recall of tobacco advertising was for pop-ups and banners (60.7%) followed by email (24.6%) and websites (14.9%).

Danaher and Mullarkey (2003) found the longer a person was exposed to a banner advertisement, the more likely they were to remember that banner advertisement. Nevertheless, impact of the advertisement may depend upon the nature of interaction. Calisir and Karaali (2008) found subsequent recognition of advertisements depended upon whether viewers were engaging in goal-directed search or aimless browsing. Diao and Sundar (2004) compared static and animated banners and pop-ups. Pop-ups captured attention and had better recall than banners (Diao & Sundar, 2004). Nevertheless, the immediacy of the timing of pop-ups can also influence willingness to interact with a website (Moe, 2006) with a delayed pop-up being perceived as an interruption. In particular the credibility of the online source (Greer, 2003), or other indicators of credibility (i.e. Trustmarks) improved believability and willingness to interact with a website (Aiken & Boush, 2006). Similar issues are likely to apply to mobile phones and digital TV.

Rau, Chen and Chen (2006) considered factors influencing the effectiveness of mobile advertisements in terms of message recall and attitude towards products. Advertisements were either presented as: a) static text and graphics; b) static text and graphics and audio; c) animation. Messages were presented during information browsing tasks on websites designed for handheld devices. Participants were asked to browse an entertainment website or a website that provided information about geographical locations. Advertisements with audio or animations produced better recall than static banners. Participants browsing the geographical location websites were more favourably disposed to the advertising than participants browsing the entertainment website.

Alternative forms of advertisements have been trialled on digitial television. The on-screen placement of a television banner can be compared with website banners. As the banner is imposed upon a viewing task, the banner is comparable to a pop-up on a website, but it cannot be clicked away. Hence television banners are potentially an attention-getting and unskippable advertising format. Cauberghe and De Pelsmacker (2008) considered likely consumer response to banners on digital television. A sample of 281 undergraduate students watched interactive (quiz show) and non-interactive (NYPD Blues) programs, in which products with varying levels of involvement were presented. The high involvement product was a car. The low involvement product was a toothpaste brand. Participants were instructed to watch television as they would at home. After 1 minute 20s. of viewing a banner appeared at the top of the screen for 40 seconds. Recall and recognition of product and brand were then tested. Product recall and recognition were poorer for the less interactive program. Participants' general attitude towards banner advertising influenced attitude toward the portrayed product. Participants that were more receptive to banner advertising had a better attitude to the portrayed product.

These alternative electronic formats for advertising are also an area potentially requiring control (see Monaghan, Derevensky, & Sklar, 2008). Electronic forms of advertisement such as internet pop-ups, email, and websites have been used for products for

which advertising might otherwise be constrained (e.g. Tobacco) (Hrywna, Delnevo, & Lewis, 2007), and their use seems to be increasing. For instance, the proportion of internet users reporting exposure to tobacco product advertising has increased from 6.9% in 2001 to 17.8% in 2005 (Hrywna, Delnevo, & Lewis, 2007).

3.5 Decision aids and gambling

Previous sections considered how recommenders have been developed to influence consumer choices. This section considers how people might respond to online advice. In this regard socio-cognitive accounts have suggested that gambling involves decision making albeit with some irrational elements (e.g. Coventry, 2002; Walker, 1992). To the extent to which gambling is a decision process, ongoing research has sought to influence the gambler's decision making process by supplying decisional support.

It appears that provision of decision aids can influence behaviour during simulated gambling. In a game of computerised blackjack, Chau and Phillips and Von Baggo (2000) considered the effect of online decisional support upon players' wagering. Although not significant, players tended to wager more in the presence of decisional support. Subsequent studies have found wagering can increase with decisional support. An unpublished study by O'Hare, Phillips, and Moss (2005) indicated higher levels of wagering in the presence of decisional support. This was replicated by Phillips and Ogeil (2007). Philips and Ogeil (2007) found players were more likely to bet more in the presence of Basic advice in a higher stakes condition than the low stakes condition. There was also some evidence that participants relied upon advice after a dose of alcohol bringing them to a blood alcohol concentration of 0.05%. Players seemed to spend more time attending to advice after consuming alcohol. It seems that participants were more likely to use advice when they were impaired or when there was more at stake. An additional unpublished study by Lok (2008) suggested that the provision of a decision aid imposes an additional processing load on players. Participants were exposed to Basic advice for one, three, or seven seconds. The influence of the aid increased with greater exposure time. Most of the effect of the decision aid had occurred by three seconds. Apparently participants need time to appreciate and utilise a decision aid.

Nevertheless, the effect of a decision aid upon player behaviour is not simple. Phillips and Amrhein (1989) examined wagering when players controlled their own cards, in comparison to a simple "never bust" algorithm. Players bet more when they could control their own cards and use their own strategies. In addition players wagered significantly less on an algorithm when they were losing. Such data suggest that players prefer their own personalised strategies, and are more prepared to abandon advice in the face of losses. When providing online Basic advice to participants, Chau, Phillips and Von Baggo (2000) found participants that were provided with online advice initially felt the outcome of their gambling was less likely to be due to luck, and were less optimistic as to the outcomes of the next set of hands to be played.

These studies indicate that while gambling may not be considered necessarily rational, there are elements of gambling behaviour that require time, and involve decision making (see Ceci & Liker, 1986; O'Hare, Phillips, & Moss, 2009; Rosecrance, 1988). A decision aid seems to support the belief that the odds can be overcome, but appears to be abandoned in the face of losses (Chau, Phillips, & Von Baggo, 2000). Indeed others have observed that

reliance upon decision aids appears to vary as a function of the perceived reliability of the aid (Parasuraman & Riley, 1997) (these issues will be discussed in section 5).

Such studies demonstrate that decision aids can influence player behaviour. Although it could be argued that decision aids such as Basic decrease risk, they still result in a loss in the longer term (Wagenaar, 1988). In addition, while some other forms of gambling (e.g. sports and racing) are amenable to decisional support (e.g. form guides), a rational basis for decisional support for other forms of gambling can be more tenuous (e.g. roulette, money wheels) (Wagenaar, 1988). *There are a number of websites offering race and sports tipping* (http://www.propun.com.au/) (http://Oztips.com).

Tipping advice has the potential to be used inappropriately. Organisations such as Scamwatch issue warnings about prediction systems that promise that the user will get rich quick (http://www.scamwatch.com.au/content/index.phtml/tag/ComputerPredictionSoftware). Indeed, the potential for mass communication to gamblers also creates additional issues. If sufficient individuals bet on the same horse, it can alter the payouts in totalisator systems. It remains to be seen whether the swarming behaviour that can be generated by mobile phones (Souza, 2006) will manifest itself in TAB betting, but the stockmarket already shows signs of attempted influence in this fashion (e.g. http://www.scamwatch.com.au/content/index.phtml/tag/SharePromotionshotTips).

3.5.1 Gambling and Consumer Warnings

In contrast with the aims of advertisers, attempts to inform or warn consumers have slightly different aims, and are thus less concerned as to intrusiveness of messages. Such systems are more interested in consumers attending to and recalling warning messages.

Given that elements of gambling involve decisions, other studies have considered the use of online messaging seeking to inform consumers, increase responsible gambling and reduce the incidence of problem gambling (Monaghan, 2009). Mechanisms already in place in the UK include clocks and timers indicating the current time, and time spent on the machine, and the amounts bet, won and lost, but responsible gaming information may be harder to find on websites (Monaghan, 2009). Given concerns that gamblers may lose track of time, Monaghan (2009) suggested the use of interruptions to allow patrons to reevaluate their current behaviour.

The Queensland Responsible Gambling Strategy has examined a variety of consumer protection measures (Reid, 2005), in particular there is an interest in supplying adequate and meaningful information about the gambling product to the consumer. Relevant information might include the odds of winning, the amounts of time played, and advice to gamble responsibly (Reid, 2005). Hence a variety of messages have been trialled in a variety of forms with consumers (Reid, 2005).

Cloutier, Ladouceur, and Sévigny (2006) considered the effect of messages and pauses. Students scoring high on illusion of control were given $20 with which to play on video lottery terminals. Students were either exposed to messages targeting erroneous beliefs (N=20) or were exposed to similar numbers of pauses (N=20). The strength of erroneous beliefs was lower for participants that were informed as to the randomness of gambling outcomes compared to those who received pauses. Nevertheless there were no effects of pauses or messages on the number of games played.

Others have examined the format of the messages presented. For instance Monaghan and Blaszczynski (2007) provided static or dynamic warnings on electronic gaming machines. The static warning was a fixed government-mandated message placed on the frame of the EGM directly next to the gaming buttons. In the dynamic mode, the identical message was presented in the form of a translucent display scrolling across the screen during play. They reported that players attended to and comprehended warning messages that were presented in a dynamic format. Presenting warnings in this way could increase awareness and recall of harm minimisation messages. Monaghan and Blaszczynski (2008) examined a variety of static and pop-up messages (e.g. "do you know how long you have played?"). They found that pop up messages had a greater effect upon thoughts and behaviours.

Online advertising, particularly pop-up messages can attract attention, but can be described as intrusive by consumers. Whereas advertisers seek to reduce perceived intrusiveness, the interruption caused by a pop-up message may be a useful method of targetting erroneous beliefs, informing consumers of the risks of gambling, and reducing harm (Monaghan, 2009).

Other systems could be employed to check whether there is actually a human operator awake and in charge of play (Yampolskiy & Govindaraju, 2008) . In a Completely Automated Public Turing test to tell Computers and Humans Apart (CAPTCHA) a response is required to some information that is only readable by a human operator. To continue play, the human must read a degraded or distorted image and respond. Such systems could serve to prevent problem gamblers from locking the "play" button down. Such systems could also prevent robots from playing online and systematically engaging in repeated funds transfers. Although potentially intrusive, features such as trustmarks could increase the credibility of websites and increase people's willingness to interact with the site (see Section 5).

Figure 3.1 an example of a Google text-based CAPTCHA.

3.5.2 Consumer tracking

Once someone gambles electronically, there is a potential to track their gambling behaviour. As a simple matter of quality control and customer service electronic transactions are regularly tracked by the organisation providing products for consumers (http://www.whitedot.org/spyinteractive/). Instead of paying an expensive company to do market research, the data are collected directly from consumers. This is one of the reasons for concern about privacy, as this information is valuable, and could be sold on to other parties (Wang, Lee, & Wang, 1998). The capacity to track consumer behaviour already manifests itself in consumer loyalty schemes (see Palmer & Mahoney, 2005). The ability to determine how much a player is worth per session, (Browne, 2005), then allows for

calculations of the level of inducement that can be offered to players (see http://www.theage.com.au/national/man-sues-crown-for-30-million-loss-20090518-bcqt.html). Customer tracking may be also able to detect when a person has developed a problem (Schellinck & Schrans, 2004; 2006).

For accounting purposes and as part of the provision of services, it is necessary to record electronic transactions (Lenard & Rubin, 2010). It is not clear whether users are aware of the monitoring that occurs as part of the provision of online services. Indeed some authors suggest that consumers are not interested in how such data are collected and eventually used (unless a problem arises) (Nehf, 2007). It has been suggested that economic benefits are conferred from the integration of such data and the enhanced capacity to target likely consumer audiences (Lenard & Rubin, 2010). For instance, after Sévigny, Cloutier, Pelletier, and Ladouceur (2005) accessed a number of online gaming sites they reported receiving 1000s of targeted emails seeking to encourage further online play. But this highlights that the records of these online transactions are actually valuable (see Fasli, 2007), potentially consisting of lists of "high-rollers". Hence although records are kept, this does not necessarily mean that such information can be accessed by organisations seeking to curb problem gambling. A variety of privacy acts across relevant jurisdictions will serve to restrict the traffic in such information (see Wang, Lee, & Wang, 1998), unless the information is: within the public domain; exchanged within sections of the same commercial entity; or lodged in an information clearing house (http://www.indiancallcenterz.com/outbound_service.php).

A variety of types of information are available when conducting transactions electronically. From the IP address, closest cell phone towers or global positioning system, information can be accessed as to the approximate location of the consumer (http://www.find-ip-address.org/). Such information can indicate whether a consumer resides in a jurisdiction where online gambling is banned. The time, duration, and amounts of transactions can be recorded, and as records are typically kept of these transactions for accounting purposes, the history of these transactions then creates a profile of the consumer (Fasli, 2007).

Howard Shaffer's group at Harvard managed to gain access to the transaction records of *bwin*, an online gaming provider (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010). Shaffer's group tracked activity of online poker players (LaPlante, Kleschinsky, LaBrie, Nelson, & Shaffer, 2009), and sports gamblers (LaBrie, LaPlante, Nelson, Schumann, & Shaffer, 2007; LaPlante, Schumann, LaBrie, & Shaffer, 2008), and people gambling at an online casino (LaBrie, Kaplan, LaPlante, Nelson, & Shaffer, 2008). This was a major achievement in that it allowed researchers to address actual rather than reported gambling (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010). In general these studies observed that the majority of individuals appeared to gamble in moderation, but the population had an appreciable skew, with a minority gambling appreciably more (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010). The transaction records alone cannot determine whether an individual was a problem gambler, but tracking data suggested that compared to the non-heavy wagerers, the heavier wagerers tended to spend more time (LaBrie, Kaplan, LaPlante, Nelson, & Shaffer, 2008; LaBrie, LaPlante, Nelson, Schumann, & Shaffer, 2007), and that their activity levels were sustained or increased over time (LaPlante, Schumann, LaBrie, & Shaffer, 2008). Tracking statistics allow policy makers to discuss actual behavior rather than dealing with expert opinion (which could be wrong), or the faulty memory and social desirability that can colour self reports (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010).

It is likely that the more involved players were problem gamblers, but this cannot be determined with certainty from these tracking studies. To extrapolate from tracking data to conventional indices of problem gambling status (i.e. SOGS, DSMIV, CPGI) requires further information. Some of the work that might allow such extrapolation has however been done within gaming venues. For instance Schellinck and Schrans (2004) determined that individuals that played EGMs for longer periods of time, and that sought additional funds were more likely to be problem gamblers (see also Delfabbro, Osborn, Nevile, Skelt, & McMillen, 2007).

A variety of forms of decisional support have been considered and trialled upon people using electronic gambling devices:

1) Time management advice informs players as to the passage of time. The provision of clocks and timers provide this function, although there are doubts as to the efficacy of the provision of time information in controlling gambling (Ladouceur & Sévigny, 2009).

2) Funds management advice informs players as to the amounts of money wagered, lost or won. Ladouceur and Sévigny (2009) reported favourable player response to cash displays, but it is unclear whether this would translate into better self-control during actual play.

3) Precommittment systems seek to encourage players to make decisions as to the amount of time or money they will spend *before* a gambling session. Such systems are thought to support and remind the player in the excitement of the moment as to what their original plans and obligations were. There are some concerns that time precommittments (Ladouceur & Sévigny, 2009) may not be effective. For instance Schellinck and Schrans (2007) reported that regular gamblers ignored systems that allowed them to set time limits on their play. In their study only 1.5% of users set a time limit for a 'day session' and 0% of users set a weekly time limit. There are also some concerns that spending precommittment systems may not be effective for problem gamblers (Nower & Blaszczynski, 2010). Schellinck and Schrans (2007) reported only 11% of regular gamblers set daily money limits using a responsible gaming system.   Those gamblers that exceed deposit limits may exhibit unfavorable gambling behaviours (Broda, LaPlante, Nelson, LaBrie, Bosworth, & Shaffer, 2008). Nevertheless, such systems may be effective.   Nelson, LaPlante, Peller, Schumann, LaBrie, and Shaffer (2008) tracked online gamblers and found that the 1.2% that had used an online gambling site's self-limit facility tended to reduce their online activity.

4) Self-barring systems can also be imposed on electronic systems. Where players find they have problems limiting their play, it is possible to implement self-barring. Schellinck and Schrans found that only 2% of the players activated a '48h-stop' button that provided an immediate lock-out for 48hrs from all VLTs. Only n=2 users used the lockout for one month period. Geolocation technology could also be used to exclude players whose jurisdictions preclude online gambling. Although potentially less precise, it also technically possible (with the player's consent) to send online warnings to people when they approach a gaming venue (see Aalto, Göthlin, Korhonen, & Ojala, 2004; Yang, Cheng, & Dia, 2008; Yuan & Tsao, 2003).

5) Strategic advice focuses upon assisting people's play. For instance tipping web sites (http://www.tipster.com.au/) and form guides (http://www.puntersparadise.com.au/) advise as to the best horse to wager on. Software can advise as to better strategies during poker (Dedonno & Detterman, 2008) or Blackjack (O'Hare, Phillips, & Moss, 2010) that will tend to minimise loss.   Demonstration modes can also be used to

educate players, but in an unregulated environment, the wrong messages can be sent. Sévigny, Cloutier, Pelletier, and Ladouceur (2005) examined the demonstration modes of 117 online gambling sites. They observed that 39% gave an unrealistic and inflated impression of the likelihood of winning in the demonstration mode.

6) Educational advice seeks to counter irrational cognitions experienced by some gamblers. There are suggestions that this may be useful. The provision of online warnings targetting irrational cognitions appears to correct irrational beliefs and influenced behaviour both in the laboratory (Floyd, Whelan, & Meyers, 2006) and at the gaming venue (Gainsbury, & Blaszczynski, 2010).

Some degree of monitoring and tracking may be accepted (Nehf, 2007), but users may not necessarily submit to additional scrutiny, such as may occur when asked to complete online surveys.   This may be due to concerns that important personal details such as passwords or financial records be recorded and used improperly (Renaud & Gray, 2004). Indeed authors that have tracked internet activity that have sought additional access have received appreciably less compliance. For instance, Phillips, Jory and Mogford (2007) sought to monitor usage of an educational website. Of the 695 students using the site, only 77 were willing to supply information as to their decisional style. Hence there may be some reluctance to complete gambling screening tests that could eventually be linked to their online gambling activity. More importantly Schellinck and Schrans (2004) and Delfabbro, Osborn, Nevile, Skelt, and McMillen (2007) observed that problem gamblers were more likely to report playing multiple EGMs at the same time. Phillips, Ogeil, and Mann (2008) found that problem gamblers were more likely to report visiting more than one gaming venue. Hence it is likely that it will be difficult to track problem gamblers, and that *tracking statistics are likely to be underestimates of their actual gambling*.

There are some additional factors that might influence the efficiency of any such automated systems. Schellinck and Schrans (2004) sought indicators at the gaming venue that might predict patrons with gambling problems. It was suggested that these indicators might be used to by gaming providers to determine which patrons might need assistance. Some of the cues reported in such studies (e.g. duration of play, seeking further funds) can be useful in online gambling on a variety of electronic devices. Indeed some systems supporting games like the Wii, iPhones and iPad are now motion sensitive, and will be able to detect other cues like rough handling of the electronic gaming device. Nevertheless, there are liable to be limitations to automated systems that seek to detect changes in the amount of time or money gambled with offers of assistance.

Automated systems monitoring gaming activity may need a stable baseline from which to detect any change in activity (Shaughnessy, Zecmeister, & Zechmeister, 2006). Hence there needs to be a reliable system of monitoring gambling behaviour. When some behaviours are offline, or there is infrequent activity, or considerable variability in baseline gambling behaviour, this can influence baselines and cause problems detecting changes in activity (Shaughnessy, Zechmeister, & Zechmeister, 2006).   In addition, where there is a drift in activity, with levels of activity steadily increasing or decreasing, this can also cause problems detecting a significant change in activity levels (Shaughnessy, Zechmeister, & Zechmeister, 2006).

Other problems would arise if a gambler can log in from several computers or under several names. Multiple user accounts can cause problems for accounting, and any underreporting will compromise the detection of an onset (or offset) of activity. If a gambler

uses more than one service provider, it will be harder to determine their levels of usage. As a consequence, an inaccurate or unstable baseline will make it harder to detect any onset (or offset) of activity requiring intervention. For instance, Phillips, Ogeil, and Mann (2008) observed that problem drinkers or problem gamblers were more likely to go to more than one venue for their drinking or gambling. Any one provider of such services would thus be less able to notice a problem, whether from unreliable observation, or reduced estimates of levels of activity.

Although tracking technology may tend to underestimate the behaviour of more heavily involved gamblers, such mechanisms certainly offer potential methods of informing and protecting gamblers if properly controlled. Regulation is one method of imposing such controls. In an unregulated environment consumers are at risk of unrealistic impressions and repeated messages suggesting that they have sufficient skill or luck to overcome the odds and make considerable money gambling (Sévigny, Cloutier, Pelletier, & Ladouceur, 2005).

The techniques to to profile, track and pursue consumers have been developed, but systems are also under development to monitor, warn and inform consumers. Hence there are a variety of systems to assist or inform consumers considering staking money on forms of online gambling. As there is a need to restrict access to specific age groups or certain jurisdictions, the following section considers whether it is possible to completely block access to gambling propositions.

3.6 Restricting Access

The staking of money presupposes access to the proposition. Even if such propositions are considered appropriate for adults to view, there may still be concerns about the need to restrict access under certain circumstances and specific populations. Although the small screens of mobile phones notionally make them a "private" device, their mobility and ubiquity potentially mean that unacceptable content such as violent computer games, pornography or gambling can be accessed in inappropriate locations (e.g. schools) (Finn, 2005).

Currently there is not enough being done to control the access of minors to inappropriate content (Byron, 2009), but this is an area of considerable effort (ACMA, 2009). Methods of restricting access to minors may involve attempts to verify age, the most common method being use of credit cards (ACMA, 2009, p. 43), but such systems can be circumvented by prepaid or debit cards, and are vulnerable to other problems. The use of a credit card to verify identity can lead to inappropriate charges being made. For instance a recent "market research" scam purporting to represent McDonalds asked respondents for credit card details to enable a $50 "payment", but instead led to inappropriate charges being made against victim's credit cards (http://www.acma.gov.au/WEB/STANDARD/pc=PC_310566). Some countries have developed national identity card systems, but uptake appears to be low (ACMA, 2009, p. 45).

3.6.1 Under age gamblers

An important issue for online gamblers is establishing the bona-fides, integrity and honesty of the operators of a remote venue. Similarly, operators of such venues need to establish the true identity of would-be patrons. Regardless of the mechanism of interaction (e.g. on-line, through the TV or via a mobile phone) gaming operators need to be able to ensure that both they, and their would-be patrons, are acting within the Law and so need to

establish new customers are, for example, of legal age to gamble, located in a jurisdiction that allows remote gambling and are not using the gaming venue for a fraudulent or prohibited activity such as "laundering" illicit money in an effort to avoid leaving "...a recognisable audit trail" (Taylor, 2003). Operators then need to establish the true identity of their customers.

Such issues are currently typically addressed by operators including the conditions under which people can play in their "Terms and Conditions" (or "End User Statement", "Player agreement" etc.). Such statements are exemplified by *Party Poker*, an internet casino licensed in Gibraltar (https://secure.partyaccount.com/about/legal_information_s.do

> Accessed: 2/04/09).
> "2.1**.** You may only use the Services if You are 18 years of age or over (or such other higher minimum legal age in Your jurisdiction) and it is legal for You to do so according to the laws that apply in Your jurisdiction."
> "4. TRUE IDENTITY AND ONE ACCOUNT
> The name on Your Account must match Your true and legal name and identity and the name on Your Account registration must match the name on the credit card(s) or other payment accounts used to deposit or receive monies in Your Account. To verify Your identity, We reserve the right to request at any time satisfactory proof of identity (including but not limited to copies of a valid passport / identity card and/or any payment cards used) and proof of address (including but not limited to a recent utility bill or bank statement). Failure to supply such documentation may result in suspension of the Account. You are prohibited from holding more than one (1) Account in connection with Your use of the Party Platforms"
> "14. FRAUDULENT ACTIVITIES AND PROHIBITED TRANSACTIONS
> We have a zero tolerance policy towards inappropriate play and fraudulent activity. If, in our sole determination, You are found to have cheated or attempted to defraud Us and/ or the Group or any other user of any of the Services in any way, including but not limited to game manipulation or payment fraud, or manipulation of the multi-currency facilities, or if We suspect You of fraudulent payment, including use of stolen credit cards, or any other fraudulent activity (including but not limited to any chargeback or other reversal of a payment) or prohibited transaction (including but not limited to money laundering), We reserve the right to suspend and/or close Your Account and to share this information (together with Your identity) with the police, regulatory authorities and other online gaming sites, banks, credit card companies, and other such appropriate agencies".

Intending remote gamblers are required to agree to the operators Terms and Conditions before being allowed to download the software necessary to gamble at that venue. Agreement is given by would-be gamblers ticking a box labelled "I agree" (or something similar) while those opting for the "I do not agree" option are prevented from downloading the proprietary software and so cannot proceed to a point where they are able to gamble.

Such self-identification/authentication relieves game operators of the need to access the veracity of the information supplied by potential gamblers making them solely reliant on the honesty of the intending gambler. Under such conditions, *under age individuals gamble, but they cannot collect any winnings*. While it could be argued the existing method of user verification and authentication clearly works in favour of game operators in terms of age/jurisdiction, the possible consequence to operators of being found to be involved in

money laundering provides some impetus for them to pursue more sophisticated and independent technologies. One such potential emerging technology is that of biometrics.

3.6.2 Biometrics

Biometrics has been described as "…the science of establishing the identity of an individual based on the physical, chemical or behavioral attributes of the person" (Jain, Flynn, & Ross, 2008). Such attributes include a person's signature (Lee, Berger, & Aviczer, 1996), fingerprints (Maltoni, Maio, Jain, & Prabhakar, 2003), palm-prints (Zhang, 2004), iris pattern (Daugman, 2004), face (Hammoud, Abidi, & Abidi, 2007), gait (Nixon, Tan, & Chellappa, 2006) and possibly even their odour or ear characteristics (European Commission Directorate, 2005).

While many of an individual's attributes remain constant as they age (e.g. fingerprint/palm-print) others change over time (e.g. face, voice and gait) and it is those attributes that have the potential for age authentication. There is however, a significant technical issue associated with using biometrics.

Unlike passwords where a perfect match between the user-supplied alphanumeric password and that stored in the system is both required and obtainable for authentication, some allowance for variation must be built into any biometric system to account for factors such as sensor degradation, variations in lighting (important in face recognition for example), changes in biometric characteristics due to illness etc. Allowance for variation results in uncertainty and it is that uncertainty which compromises the accuracy of biometric verification (Jain & Ross, 2009).

It was considerations such as those that led a 2005 European Commission into the impact of biometrics on society to conclude:
> "…biometric identification is not perfect - it is never 100% certain, it is vulnerable to errors and it can be 'spoofed'. Decision-makers need to understand the level of security guaranteed through the use of biometric systems and the difference that can exist between the perception and the reality of the sense of security provided. The biometric system is only one part of an overall identification or authentication process, and the other parts of that process will play an equal role in determining its effectiveness." (European Commission Directorate, 2005).

The "other parts" of an identification/authentication process alluded to by the Commission included information about credit/debit/ID card etc. details. While a combination of biometrics and credit card details might serve to verify the age of an adult user, the provision of credit/debit/ID card details by a minor is a major difficulty in the on-line verification of an under-age user.

Any on-line verification process requires information supplied by a user to be compared against information stored in public and private databases. Verification is achieved if an acceptable degree of match is found between stored information and information supplied by the purported user. In the case of minors however, there is little valid information available in databases since society restricts the requirement to have/divulge identifying information to persons over the legal "adult" age. Minors do not, for example, have a drivers license, tax file number, credit card, health care card or own property.

Such considerations were discussed in a 2008 European Commission into, amongst other things, age verification across various media including the internet and mobile platforms. The commission reviewed a number of options and sought input from age verification solutions providers, including those advocating biometrics. The commission found biometrics to be incapable of predicting exact age and ultimately concluded that while some multi-faceted approaches involving for example, electronic identity cards (eID cards) or credit cards showed promise (European Commission Directorate-General, Information Society and Media, 2008):

> "…most stakeholders seem to agree that there is no existing approach to Age Verification that is as effective as one could ideally hope for, a view shared by those Age Verification Solution providers and services present at the Safer Internet Forum".

A similar finding was recently reported following a legal battle between the American Civil Liberties Union and the US Attorney General over the Child Online Protection Act (COPA), introduced by the US Congress in 1998 and aimed at controlling children's access to sexually explicit material over the internet. The law was immediately challenged by American Civil Liberties Union on the basis of, amongst other issues, free speech and so instigation of the law was delayed until the matter was resolved in court. Resolution took some 10 years with the matter eventually reaching the US Supreme Court which declared the law unconstitutional on January 22, 2009 (Neuburger, 2009).

Amongst reported findings were :

> "…that there is no evidence of age verification services or products available on the market to owners of Web sites that actually reliably establish or verify the age of Internet users. Nor is there evidence of such services or products that can effectively prevent access to Web pages by a minor" (US Attorney General, 2007).

The trial also noted that requiring debit, credit or payment card information was no guarantee of age since the person entering the information does not have to be the person to whom the information applies. Further problems associated with a law requiring age verification technology included the possible imposition of a cost to content providers owing to lost traffic; loss of anonymity to users and jurisdictional considerations that prevent enforcement of any such requirement on Websites located outside the USA (US Court of appeals, 2008) thereby allowing determined minors continued access to inappropriate material.

There are of course other methods of identification. Surgically implanted microchips have already been pioneered on humans (Warwick, 2002), but there is likely to be problems of acceptance within electorates. The Liberals predicted that smart national identity cards were to be in use by 2010 (http://www.smh.com.au/news/national/official-national-card-due-by-2010/2006/04/26/1145861419456.html), but plans were shelved by the Labour government (http://www.efa.org.au/Issues/Privacy/accesscard.html).

3.6.3 Filters
Content filters are another attempt to control the information that is available on the internet. Filters can either operate on a black-list principle or a white-list principle. A Black-list filter allows access to all but a specific list of sites (http://www.acma.gov.au/WEB/STANDARD/pc=PC_90167). It is more flexible, but

vulnerable to problems as the list of inappropriate sites requires updating, for example when the blacklist is leaked (see Moses, 2009). A White-list filter blocks access to all but a specific list of sites. It is far more secure, but severely curtails the material that can be accessed using the internet (see Peltz, 2002). The Australian government has attempted to implement content filters (at a cost of $84M) to assist the censoring of internet content (http://www.netalert.gov.au/filters.html), but with limited success (ACMA, 2009). There is a limited uptake of content filters, possibly because the content filters were difficult to install (ACMA, 2009), and the content filters could be circumvented (Turner, 2008). In the UK, Byron (2008) suggested that content filters be loaded on all commercially available computers at point of sale. Alternatively government sponsored content filters could be installed automatically with internet accounts, as has been arranged in France (ACMA, 2009). For instance the internet subscribers in France who choose to have parental controls installed select one of three standard profiles: 1) the *child profile* allows access only to a pre-defined index of websites; 2) the *teenager profile* uses indexes of pre-assessed content to block access to **online gambling** and internet content that is sexually explicit, promotes hatred or violence or is drug related; 3) the *adult profile* allows open access to internet content. Other systems developed in the US seek to impose time limits on access (ACMA, 2009, p. 38). In the UK, providers of mobile phones have voluntarily acted to restrict access to internet content (http://www.imcb.org.uk/assets/documents/10000109Codeofpractice.pdf). The Code covers new types of content, including visual content, **online gambling**, mobile gaming, chat rooms and Internet access. It does not cover traditional premium rate voice or premium rate SMS (texting) services, that continue to be regulated under previous codes of practice. The European Union also has codes that make provisions for restrictions upon mobile phone content and times of internet access.

Nevertheless, there are problems with the use of white or blacklist filters to block access to inappropriate sites. There can be discussion as to which sites are inappropriate. For instance content filters have been used to censor access to "inappropriate" sites, such as those criticising the Thai royal family (Asher, 2009). Although considerable effort has been devoted to developing and updating filters they remain prone to error: missing inappropriate sites; and blocking appropriate sites (Gedda, 2009; Moses, 2008; Peltz, 2002). For example, there was complaint when the UK company Betfair was one of the sites included in the Australian government's "black list" (Pauli, 2009).

Unlike the blacklist approach, other classes of filters operate on categories of content or keywords (http://www.netalert.gov.au/filters/faqs.html#q6), but are still prone to some degree of error. For instance, Ho and Watters (2004) claimed better performance (99.1%) filtering pornography sites, by filters that analysed the structure of the websites and detecting key words used. Chou, Sinha, and Zhao (2008) report similar success rates detecting inappropriate internet use within a specific workplace (computer programming in the IT industry) using text mining and text categorisation. Even so, because these filters target a specific application or domain, they are less likely to be successful across multiple applications and domains.

Hunter (2000) compared four commercially available filters and examined their ability to filter 200 websites. Of these websites 18% had objectionable content (language, nudity, sex or violence). On average these filters correctly blocked objectionable material 75% of the time, but also excluded 21% of non-objectionable material. Peltz (2002) reports an 80% accuracy is common for filtering technology. Nevertheless, some of the anecdotally reported errors involve the blocking of the sites belonging to filtering campaigners, an irony

that subjects proponents to potential ridicule (Peltz, 2002, p. 413). The Australian Library and Information Association (2007) reported the results of a survey on internet filtering. Of the 104 responding libraries 39% used filtering software, but were concerned as to the reliability and accuracy of filtering software. Although these libraries primarily filtered pornography, violence, hate, and web-based mail, libraries also filtered gambling.

There would be other options where internet gaming is legalised that utilise the architecture of the internet. Currently voluntary standards have been created for regulating internet casinos (Scoolidge, 2006). An organisation called the e-Commerce and Online Gaming Regulation and Assurance (eCOGRA) have suggested a set of standards called eCOGRA Generally Accepted Practices (eGAP). The standards set forth by eCOGRA address money laundering, fraud, underage and problem gambling (Scoolidge, 2006). Organisations that comply with these voluntary standards can claim a seal of approval. Failure to comply with such standards can result in the removal of approval. Admittedly this is unlikely to do much to deter a disreputable operator. Hence Scoolidge (2006) suggested that approved operators be registered on a specific internet domain name. On the internet, domain names serve as registries and methods of navigating on the internet. Domain names such as .com or .org indicate a commercial company or organisation. Scoolidge (2006) suggested that a specific domain be created for approved and regulated internet gaming, such that operators that did not comply with approved standards could be removed from this approved domain. Gamblers cannot place money on a website they cannot see.

Conversely there have been other illegal methods of blocking access to websites. Consumer access to internet gambling sites have also been blocked by criminal groups making extortion demands (Heath, 2008). The websites of organisations not complying with demands for money are swamped by multiple (ghost) attempts to access their website (Leyden, 2004). The fictitiously high traffic on the server denies service to genuine consumers. These are called Denial of Service attacks. Threats of this nature were made during the Melbourne cup in 2007 (Tung, 2007). Owens (2006) suggests that this is one of the areas where regulators could assist the providers of online gambling.

3.6.4 Funds transfer

Online gaming also involves financial institutions when money is staked. Financial institutions are involved when money is forwarded to an online casino for the purpose of gaming. Attempts have been made to restrict financial transactions associated with child pornography (ACMA, 2009, p. 69). The Financial Coalition Against Child Pornography has members from banking, payment industries, and internet service companies that seek to target payment systems and obstruct the flow of funds. An industry response has been to seek alternative payment systems. For instance in Australia distributors of prepaid cards have been sought for the pornography industry (www.atlasmedia.net.au).

Where online gaming is illegal, there have been attempts to restrict the movement of funds for the purpose of gambling (Merzer, 2009). America's "wire transfer act" (US Government Accounting Office, 2002, p. 12) has been used for this purpose (Rose, 2006). In the USA credit card companies will not engage in transactions involving gambling (Merzer, 2009). This is partly due to concern as to the legality of transactions but also the risk to the consumer (US Government Accounting Office, 2002). Credit card companies such as American Express will not accept internet gambling providers as appropriate merchants (US Government Accounting Office, 2002, p. 20-21). Credit card associations such as Visa and

Mastercard assign codes to transactions. Transactions coded as internet gambling are to be blocked (Merzer, 2009).

Money laundering is potentially a concern for governments and casinos (Taylor, 2003, pp. 121-130). In addition to restrictions on the flow of money, there may be a variety of obligations imposed by governments to record and monitor the flow of money (ASIC - http://www.asic.gov.au/asic/asic.nsf), and information (ACMA - http://www.acma.gov.au/WEB/HOMEPAGE/PC=HOME). For legal issues associated with the monitoring of internet traffic see Branch (2003).

With respect to issues such as financial transactions, unfortunately there have been problems coding and determining the legality of transactions (US Government Accounting Office, 2002, p. 22). In addition, the audit trail may be confused by the involvement of third parties (Taylor, 2003, pp. 121-130). Debit cards (Owens, 2006) or electronic cash systems such as PayPal are potentially a means of disguising gambling transactions (US Government Accounting Office, 2002, p. 27), but the USA has been pursuing such companies for supporting illegal activities (see http://www.usdoj.gov/usao/nys/pressreleases/January07/Neteller%20Arrests%20PR.pdf). The technical issues associated with electronic cash will be addressed again in Section 5.

3.7 Summary

The long term goal of organisations regulating the internet is to allow access to electronic services to all individuals using any web capable platform. Hence this section considered likely mechanisms that could control underage gambling and otherwise influence wagering behaviour. Filters can be used to block access to gambling technology, but they are unlikely to be 100% successful. In addition, biometrics alone will not suffice to block underage gambling. Nevertheless a combination of these approaches may be more efficacious. If consumers gamble electronically, there is the potential for them to be tracked and either offered inducements, or given electronic warnings to minimise harm. Although there is the potential with mobile phone technology for individuals to gamble anywhere at any time, there is also the potential for inducements or warnings to target specific individuals (using biometrics) at specific locations (near gaming venues) and times (e.g. during play).

3.8 References

Aalto, L. Göthlin, N., Korhonen, J., & Ojala, T. (2004). *Bluetooth and WAP push based location-aware mobile advertising system*. In MobiSys '04: Proceedings of the 2nd international conference on Mobile systems, applications, and services (2004), pp. 49-58.

Australian Bureau of Statistics (2007). *Patterns of Internet access in Australia, 2006*, Cat No, 8146.0.55.001 (Available via http://tinyurl.com/yw23wp ; PDF of report is at http://tinyurl.com/2gtjaj)

ACMA (2009). *Developments in internet filtering technologies and other measures for promoting online safety*. [Downloaded 27th April 2009 from http://www.acma.gov.au/webwr/_assets/main/lib310554/developments_in_internet_filters_2ndreport.pdf]

Adomavicius, G., & Tuzhilin, A. (2005). Toward the next generation of recommender systems: a survey of the state-of-the-art and possible extensions. *Knowledge and Data Engineering, IEEE Transactions on, 17*(6), 734-749.

Aiken, K.D., & Boush, D.M. (2006). Trustmarks, objective-source ratings, and implied investments in advertising: Investigating online trust and the context-specific nature of internet signals. *Journal of the Academy of Marketing Science, 34*(3), 308-323.

Amichai-Hamburger, Y. & Ben-Artzi, E. (2003). Loneliness and Internet use. *Computers in Human Behavior, 19*, 71-80.

Arch, A. (2008). *Web Accessibility for Older Users: A Literature Review* [downloaded 11th May 2009 from http://www.w3.org/TR/wai-age-literature/]

Australian Library and Information Association (2007*). Internet filtering in public libaries 2007 survey report*. [http://alia.org.au/advocacy/internet.access]

Australian Library and Information Association (2008). *Internet access in public libraries 2008 survey report*. [http://alia.org.au/advocacy/internet.access]

Austin, M.J., & Reed, M.L. (1999). Targeting children online: Internet advertising ethics issues. *Journal of Consumer Marketing, 16*(6), 590-602.

Beddows, E. (2008). The methodological issues associated with internet based research. *International Journal of Emerging Technologies and Society, 6*, 124-139.

Bianchi, A., & Phillips, J.G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology & Behavior, 8(1),* 39-51.

Bowen, A.M., Daniel, C.M., Williams, M.L., & Baird, G.L. (2008). Identifying multiple submissions in internet research: preserving data integrity. *AIDS Behavior, 12*, 964-973.

Boyera, S. (2006). The mobile web to bridge the digital divide. [downloaded 13th May from http://www-mit.w3.org/2006/12/digital_divide/IST-africa-final.pdf]

Bradley, N. M., Joseph, A. K., & John, R. (2004). PocketLens: Toward a personal recommender system. *ACM Trans. Inf. Syst., 22*(3), 437-476.

Branch, P. (2003). Lawful interception of the internet. *Australian Journal of Emerging Technologies and Society, 1*(1), 38-51.

Broda, A., LaPante, D.A., Nelson, S.E., LaBrie, R.A., Bosworth, L.B., & Shaffer, H.J. (2008). Virtual harm reduction efforts for Internet gambling: effects of deposit limits on actual Internet sports gambling behavior. *Harm Reduction Journal, 5,* 27-36.

Browne, S. (2005). *The math of player development*. Raving Consulting Press: Reno, Nevada.

Byron, T. (2008) *Safer children in a digital world.* [Downloaded 27th April 2009 from http://www.dcsf.gov.uk/byronreview/pdfs/Final%20Report%20Bookmarked.pdf

Burke, M., Hornof, A., Nilsen, E., & Gorman, N. (2005). High-cost banner blindness: Ads increase perceived workload, hinder visual search, and are forgotten. *ACM Transactions on Computer-Human Interaction, 12*(4), 423-445.

Butt, S, & Phillips, J.G. (2008). Personality and self-reported mobile phone use. *Computers in Human Behavior, 24,* 346-360.

Calisir, F. & Karaali, D. (2008). The impacts of banner location, banner content and navigation style on banner recognition. *Computers in Human Behavior, 24*, 535-543.

Cauberghe, V., & De Pelsmacker, P. (2008). The impact of banners on digital television: The role of program interactivity and product involvement. *CyberPsychology & Behavior, 11*(1), 91-94.

Case, C.J., & Young, K.S. (2002). Employee internet management: Current business practices and outcomes. *CyberPsychology & Behavior, 5*(4), 355-361.

Ceci, S.J., & Liker, J.K. (1986). A day at the races: A study of IQ, expertise, and cognitive complexity. *Journal of Experimental Psychology: General, 115*, 255-266.

Charness, N., & Bosman, E.A. (1992). Human factors in aging. In F. Craik & T. Salthouse (Eds.), *The handbook of aging and cognition* (pp. 495-551). New Jersey: Lawrence Erlbaum Associates.

Chau, A.W., & Phillips, J.G. (1995).   Effects of perceived control upon wagering and attributions in computer Blackjack. *Journal of General Psychology, 122(3),* 253-269.

Chau, A.W.L., Phillips, J.G., & Von Baggo, K. (2000).   Departures from sensible play in computer Blackjack. *Journal of General Psychology, 127*, 426-438.

Chesnevar, C. I., Maguitman, A. G., & Simari, G. R. (2006). Argument-based critics and recommenders: A qualitative perspective on user support systems. *Data and Knowledge Engineering, 59*, 26.

Chou, C-H., Sinha, A.P., & Shzo, H. (2008). A text mining approach to Internet abuse detection. *Information Systems and E-Business Management, 6*, 419-439.

Cloutier, M., Ladouceur, R., & Sévigny, S. (2006).   Responsible gambling tools" Pop-up messages and pauses on video lottery terminals, *The Journal of Psychology, 140*(5), 434-438.

Cole, M.S., Bedeian, A.G., & Field, H.S. (2006). The measurement equivalence of web-based and paper-and-pencil measures of transformational leadership. *Organizational Research Methods, 9*, 339-368.

Converse, P.D., Wolfe, E.W., & Oswald, F.L. (2008). Response rates for mixed-mode surveys using mail and e-mail/web. *American Journal of Evaluation, 29*, 99-107.

Couper, M.P., Kapteyn, A., Schonlau, M., & Winter, J. (2007). Noncoverage and nonresponse in an internet survey. *Social Science Research, 36*, 131-148.

Coventry, K.R. (2002). Rationality and decision making: The case of gambling and the development of gambling addiction. In J.J. Marotta, J.A. Cornelius, & W.R. Eadington (Eds.), *The downside: Problem & pathological gambling* (pp. 43-68). Institute for the Study of Gambling and Commercial Gaming Institute: Reno, Nevada.

Danaher, P.J., & Mullarkey, G.W. (2003). Factors affecting online advertising recall: A study of students. *Journal of Advertising Research*, , 252-267.

Daugman, J. (2004). How Iris Recognition Works? *IEEE Transactions on Circuits and Systems for Video Technology, 14*(1), 21–30.

Dedonno, M.A., & Detterman, D.K. (2008). Poker is a skill. *Gaming Law Review, 12*(1), 31-36.

Delfabbro, P. (2008). Evaluating the effectiveness of a limited reduction in electronic gaming machine availability on perceived gambling behaviour and objective expenditure. *International Gambling Studies, 8*(2), 151-165.

Delfabbro, P., Osborn, A., Nevile, M., Skelt, L., & McMillen, J. (2007). *Identifying Problem Gamblers in Gambling Venues*. Report commissioned for the Ministerial Council on Gambling, Australia.

Dellarocas, C. (2003). The digitization of word of mouth: promise and challenges of online feedback mechanisms. *Management Science, 49*(10), 1407(1418).

Diao, F., & Sundar, S.S. (2004). Orienting response and memory for web advertisements: Exploring effects of pop-up window and animation. *Communication Research, 31*(5), 537-567.

Dowling, N., Smith, D., & Thomas, T. (2005). Electronic gaming machines: Are they the 'crack-cocaine' of gambling? *Addiction, 100*(1), 33-45.

Eadington, W.R. (1995). Economic development and the introduction of casinos: Myths and realities. *Economic Development Review*, Fall, 51-54.

Eadington, W.R. (2004). The future of online gambling in the United States and elsewhere. *Journal of Public Policy & Marketing, 23*(2), 214-219.

Edwards, S.M., Li, H., & Lee, J-H. (2002). Forced exposure and psychological reactance: Antecedents and consequences of theperceived intrusiveness of pop-up ads. *Journal of Advertising, 31*(3), 83-95.

European Commission Directorate-General. Joint Research Centre. Institute for Prospective Technological Studies (2005). *Biometrics at the Frontiers: Assessing the Impact on Society For the European Parliament Committee on Citizens' Freedoms and Rights, Justice and Home Affairs* (LIBE). P. 10. Available at : http://ec.europa.eu/justice_home/doc_centre/freetravel/doc/biometrics_eur21585_en.pdf

European Commission Directorate-General. Information Society and Media (2008): *Background Report on Cross Media Rating and Classification and Age Verification Solutions. Safer Internet Forum.* Sept 25-26, Luxembourg. P. 26. Available at : http://ec.europa.eu/information_society/activities/sip/docs/pub_consult_age_rating_sns/reportageverification.pdf

Fasli, M. (2007). On agent technology for e-commerce: trust, security and legal issues. *The Knowledge Engineering Review, 22* (1), 3-35.

Finn, M. (2005). Gaming goes mobile: Issues and implications. *Australian Journal of Emerging Technologies and Society, 3*(1), 31-42.

Floyd, K., Whelan, J.P., & Meyers, A.W. (2006). Use of warning message to modify gambling beliefs and behavior in a laboratory investigation. *Psychology of Addictive Behaviors, 20*(1), 69-74.

Gainsbury, S., & Blaszczynski, A. (2010). The appropriateness of using laboratories and student participants in gambling research. *Journal of Gambling Studies*.

Gedda, R. (2009). *Banned poker sites make joker of ACMA's Internet blacklist.* [downloaded 28th April 2009 from http://www.arnnet.com.au/article/296460/banned_poker_sites_make_joker_acma_internet_blacklist]

Gedda, R. (2009). *URL blacklist 'creep' possible: Conroy.* [downloaded 28th April 2009 from http://www.computerworld.com.au/article/296842/url_blacklist_creep_possible_conroy]

Gosling, S.D., Vazire, S., Srivastava, S., & John, O.P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about internet questionnaires. *American Psychologist, 59*, 93-104.

Greer, J.D. (2003). Evaluating the credibility of online information: A test of source and advertising influence. *Mass Communication & Society, 6*(1), 11-28.

Griffiths, M. (1996). Gambling on the Internet: A brief note. *Journal of Gambling Studies, 12*, 471-473.

Griffiths, M., & Barnes, A. (2008). Internet Gambling: An online empirical study among student gamblers. *International Journal of Mental Health and Addiction, 6*, 194-204.

Griffiths, M.D. (2007). Mobile phone gambling. In D. Taniar (Ed.). *Encyclopaedia of Mobile Computing and Commerce.* Pp. 553-556. Pennsylvania, USA: Information Science Reference.

Griffiths, M.D. (1997). Psychology of computer use: XLIII. Some comments on "Addictive use of the internet" by Young. *Psychological Reports, 80*, 81-82.

Griffiths, M. (2000). Does internet and computer "addiction" exist? Some case study evidence. *CyberPsychology & Behavior, 3*(2), 211- 218.

Griffiths, M.D., & Parke, A. (2004). Why internet gambling prohibition will ultimately fail. *Gambling Law Review, 8*(5), 295-299.

Hammoud, R.I., Abidi, B.R., & Abidi, M.A. (Eds.) (2007). *Face biometrics for personal identification multi-sensory multi-modal systems.* New York : Springer.

Heath, N. (2008). *Gambling site brought to its knees by 'unstoppable' botnet.* [downloaded 30th April from http://software.silicon.com/security/0,39024655,39170296,00.htm]

Ho, W.H., & Watters, P.A. (2004). Statistical and structural approaches to filtering internet pornograpy. *IEEE International Conference on Systems, Man and Cybernetics*, 4792-4798.

Houdin, R. (1904). *Card sharpers: Their tricks exposed or the art of always winning*. Chicago: F.J. Drake & Co. [Originally published in 1860s and translated from the french by W.J. Hilliar]

Hrywna, M., Delnevo, C.D., & Lewis, M.J. (2007). Adult recall of tobacco advertising on the internet. *Nicotine & Tobacco Research, 9*(11), 1103-1107.

Huang, H-M. (2006). Do print and web surveys provide the same results? *Computers in Human Behavior, 22*, 334-350.

Hunter, C.D. (2000). Internet filter effectiveness - testing over- and underinclusive blocking decisions of four popular web filters. *Social Science Computer Review, 18*, 214-222.

Jain A.K., Bolle, R., & Pankanti, S. (Eds.) (1999). *Personal identification in networked society*. New York: Kluwer.

Jain, A.K,, Flynn, P., & Ross, A.A. (Eds). (2008). *Handbook of biometrics.* Boston, MA : Springer Science & Business Media.

Jain, A.K. & Ross, A.A. (2009). *Introduction to biometrics*. Berlin: Springer

Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York: New York University Press.

Kaplowitz, M.D., Hadlock, T.D., & Levine, R. (2004). A comparison of web and mail survey response rates. *Public Opinion Quarterly, 68*, 94-101.

Katsikides, S. (1998). *The societal impact of techno*logy. Aldershot, England: Ashgate.

Kraut, R., Kiesler, A., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues, 58*, 49-74.

Kraut, R., Olson, J., Banaji, M., Bruckman, A., Cohen, J., & Couper, M. (2004). Psychological research online. Report of board of scientific affairs' advisory group on the conduct of research on the internet. *American Psychologist, 59*, 105-117.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet Paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist, 53*, 1017-1031.

Kraut, R., Scherlis, W., Mukopadhyay, T., Manning, J., & Kiesler, S. (1996). Homenet field trial of residential Internet services. *Communications of the ACM, 39*, 55-63.

Kubeck, J., Miller-Albrecht, S., & Murphy, M. (1999). Finding information on the World Wide Web: Exploring older adults' exploration. *Educational Gerontology, 25*, 167-188.

Kurkovsky, S., & Harihar, K. (2006). Using ubiquitous computing in interactive mobile marketing. *Personal and Ubiquitous Computing, 10*(4), 227-240.

LaBrie, R.A., Kaplan, S.A., LaPlante, D.A., Nelson, S.E., & Shaffer, H.J. (2008). Inside the virtual casino: A prospective longitudinal study of actual Internet casino gambling. *European Journal of Public Health, 18*(4), 410-416.

LaBrie, R.A., LaPlante, D.A., Nelson, S.E., Schumann, A., & Shaffer, H.J. (2007). Assessing the playing field: A prospective longitudinal study of Internet sports gambling behavior. *Journal of Gambling Studies, 23*, 347-362.

Ladouceur, R., & Sévigny, S. (2009). Electronic gambling machines: Influence of a clock, a cash display, and a precommitment on gambling time. *Journal of Gambling Issues, 23*, 31-41.

LaPlante, D.A., Kleschinsky, J.H., LaBrie, R.A., Nelson, S.E., & Shaffer, H.J. (2009). Sitting at the virtual poker table: A prospective epidemiological study of actual Internet poker gambling behavior. *Computers in Human Behavior, 25*, 711-717.

LaPlante, D.A., Schumann, A., LaBrie, R.A., & Shaffer, H.J. (2008). Population trends in Internet sports gambling. *Computers in Human Behavior, 24*, 2399-2414.

Lee, L., Berger, T & Aviczer, E (1996). Reliable on-line human signature verification systems. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *18*(6), pp. 643–647

Lenard, T.M., & Rubin, P.H. (2010). In defense of data: Information and the costs of privacy. *Policy & Internet, 2*(1), 149-183.

Leyden, J. (2004). Extortionists take out UK gambling site. [downloaded 30th April from http://www.theregister.co.uk/2004/04/05/sporting_options_ddosed/]

Liu, J., & Issarny, V. (2007). An incentive compatible reputation mechanism for ubiquitous computing enviroments. *International Journal of Information Security, 6*, 14.

Lok, K. (2008). Unpublished Honours thesis, Monash University.

Maltoni, D., Maio, D., Jain, A.K., & Prabhakar, S (2003). *Handbook of fingerprint recognition*. Berlin: Springer-Verlag,

McManus, P., & Scornavacca, E. (2005). *Mobile marketing: killer application or new hype?* Paper presented at ICMB 2005. International Conference on Mobile Busniess

Merzer, M. (2009). *New Internet gambling regulations go into effect.* [downloaded 29th April from http://www.creditcards.com/credit-card-news/unlawful-internet-gambling-enforcement-act-credit-card-1282.php]

Moe, W.W. (2006). A field experiment to assess the interruption effect of pop-up promotions. *Journal of Interactive Marketing, 20*(1), 34-44.

Monaghan, S. (2009). Responsible gambling strategies for internet gambling" The theoretical and empirical base of using pop-up messages to encourage self-awareness. *Computers in Human Behavior, 25*, 202-207.

Monaghan, S. & Blaszczynski, A. (2007). Recall of electronic gaming machine signs: A static versus a dynamic mode of presentation. *Journal of Gambling Issues, 20*, 253-267.

Monaghan, S. & Blaszczynski, A. (2008). *Empirically-based responsible gambling signage: Most effective mode of presentation and message content.* Paper presented at the 18th conference of the National Association for Gambling Studies, Adelaide, 3-5th December.

Monaghan, S., Derevensky, J., & Sklar, A. (2008). Impact of gambling advertisements and marketing on children and adolescents: Policy recommendations to minimise harm. *Journal of Gambling Issues, 22*, 252-274.

Montaner, M., Lopez, B., & De La Rosa, J. L. (2003). A taxonomy of recommender agents on the internet. *Artificial Intelligence Review, 19*, 45.

Morahan-Martin, J. & Schumacher, P. (2003). Loneliness and social uses of the Internet. *Computers in Human Behavior, 19*, 659-671.

Moses, A. (2009). *Leaked Australian blacklist reveals banned sites.* [downloaded 29th April, 2009 from http://www.smh.com.au/articles/2009/03/19/1237054961100.html

Moses, A. (2008). *Net filters may block porn and gambling sites*. [downloaded 29th April , 2009 from http://www.smh.com.au/articles/2008/10/27/1224955916155.html]

Nairn, A. & Dew, A. (2007). Pop-ups, pop-unders, banners and buttons: The ethics of online advertising to primary school children. *Journal of Direct, Data and Digital Marketing Practice, 9*(1), 30-46.

Nehf, J.P. (2007). Shopping for privacy on the internet. *Journal of Consumer Affairs, 41*(2), 351-375.

Nelson, S.E., LaPlante, D.A., Peller, A.J., Schumann, A., LaBrie, R.A., & Shaffer, H.J. (2008). Real limits in the virtual world: Self-limiting behavior of internet gamblers. *Journal of Gambling Studies, 24*, 463-477.

Neuburger, J.D (2009): *U.S. Supreme Court (Finally) Kills Online Age Verification Law*. Mediashift. January 29. Available at: http://www.pbs.org/mediashift/2009/01/us-supreme-court-finally-kills-online-age-verification-law029.html. Accessed: 30/4/09

Nielsen, J. (2000). *Designing web usability*. Indianapolis: New Riders Publishing.

Nixon, M.S., Tan, T.N., & Chellappa, R. (2006). *Human identification based on gait*. London: Springer.

Nower, L., & Blaszczynski, A. (2010). Gambling motivations, money-limiting strategies, and precommitment preferences of problem versus non-problem gamblers. *Journal of Gambling Studies*.

O'Hare, M.A., Phillips, J., & Moss, S. (2005). *The effects of time-stress, risk level and deductive logic ability on decision making in dynamic environments.* Paper presented at the 32nd conference of the Australasian Experimental Psychology Society, Melbourne, April 2005. *Australian Journal of Psychology*, Supplement, p. 65.

Owens, M.D.jr. (2006). If you can't beat 'em, will they let you join? What American states can offer to attract internet gambling operators. *Gaming Law Review, 10*(1), 26-32.

Palmer, R., & Mahoney, E. (2005). Winners and losers: Segmenting a casino loyalty programme. *International Gambling Studies, 5*(2), 271-287.

Parasuraman, R., & Riley, V. (1997). Humans and automation: Use, misuse, disuse, abuse. *Human Factors, 39*, 230–253.

Parke, A., & Griffiths, M.D. (2004). Why internet gambling prohibition will ultimately fail. *Gambling Law Review, 8*(5), 295-299.

Parke, A., Griffiths, M. & Irwing, P. (2004). Personality traits in pathological gambling: Sensation seeking, deferment of gratification and competitiveness as risk factors. *Addiction Research and Theory, 12*(3), 201-212.

Pauli, D. (2009). *Betfair banned by ACMA*. [downloaded from http://www.arnnet.com.au/article/296165/betfair_banned_by_acma]

Peltz, R.J. (2002). Use "the filter you were born with": The unconstitutionality of mandatory internet filtering for the adult patrons of public libraries. *Washington Law Review, 77*, 397-479.

Phillips, J. G. & Amrhein, P. C. (1989). Factors influencing wagering in simulated Blackjack. *Journal of Gambling Behavior, 5(2),* 99-111.

Phillips, J.G., Butt, S., & Blaszczynski, A. (2006). Personality and self-reported use of mobile phones for games. *CyberPsychology & Behavior, 9*(6), 753-758.

Phillips, J.G., & Ogeil, R.P. (2007). Alcohol consumption and computer blackjack. *Journal of General Psychology, 134(3),* 333-353.

Phillips, J.G., Ogeil, R.P., & Mann, L. (2008). *Faulty decisional style is associated with problem behaviours.* Paper presented at the 18th conference of the National Association for Gambling Studies, Adelaide, December 3rd-6th, 2008.

Pittenger, D.J. (2003). Internet research: an opportunity to revisit classical ethical problems in behavioral research. *Ethics & Behavior, 13*, 45-60.

Prensky, M. (2001a). Digital natives, digital immigrants. *On the Horizon, 9*, 1-6.

Prensky, M. (2001b). Digital natives, digital immigrants, Part II: Do they really think differently?. *On the Horizon, 9*, 1-10.

Rau, P-L. P, Chen, J., & Chen, D. (2006). A study of presentations of mobile web banners for location-based information and entertainment information websites. *Behaviour & Information Technology, 25*(3), 253-261.

Reid, J. (2005). *Player information and on-screen messages - using EGMs as a communication channel.* Paper presented at the 15th annual conference of the National Association for Gambling Studies, 10-12th November, 2005, Alice Springs.

Renaud, K. V., & Gray, P. D. (2004). Making sense of low-level usage data to understand user activities. In P. Kotze & G. Marsden (Eds.), Proceedings SAICSIT 2004 (pp. 111–120). Stellenbosch, South Africa.

Renaud, K., Ramsay, J., & Hair, M. (2006). "You've got email!" ... Shall I deal with it now? Electronic mail from the recipients' perspective. *International Journal of Human Computer Interaction, 21*(3), 313-332.

Resnick, P., & Varian, H. R. (1997). Recommender systems. *Communications of the ACM, 40*(3), 3.

Rose, I.N. (2006). *The Unlawful Internet Gambling Enforcement Act of 2006 analyzed*. [downloaded 29th April 2009 from http://www.casinocitytimes.com/article.cfm?ContentAndContributorID=30106]

Rosecrance, J. (1988). *Professional horse race gambling: Working without a safety net*. Proceedings of the seventh international conference on gambling and risk taking, volume 3 (pp. 11-37). Bureau of Business and Economic Research: Reno, Nevada.

Rosenkrans, G. (2007). Online advertising metrics. In R.A. Reynolds, R. Woods, & J.D. Baker (Eds.). *Handbook of research on electronic surveys and measurements* (pp. 136-143). Hershey, PA: Idea Group Reference/IGI Global.

Sabater, J., & Sierra, C. (2005). Review on computational trust and reputation models. *Artificial Intelligence Review, 24*, 33-60

Schafer, J. B., Joseph, K., & John, R. (1999). *Recommender systems in e-commerce*. Paper presented at the Proceedings of the 1st ACM conference on Electronic commerce.

Schellinck, T. & Schrans, T. (2004). Identifying problem gamblers at the gambling venue: Finding combinations of high confidence indicators. *Gambling Research,16,* 8-24.

Schellinck, T. & Schrans, T. (2006). *The successful loyalty data based model to identify problem and at risk gamblers in casinos: Issues and implications*. Paper presented at the 16th conference of the National Association of Gambling Studies, 22nd-25th November, Sydney.

Schellinck, T., & Schrans, T. (2007). *VLT Player Tracking System*. Report for the Nova Scotia Gaming Corporation Responsible Gaming Research Device Project.

Scoolidge, P.J. (2006). Gambling blindfolded: The case for a regulated domain for gambling sites. *Gaming Law Review, 10*(3), 252-265.

Sévigny, S., Cloutier, M., Pelletier, M-F., & Ladouceur, R. (2005). Internet gambling: Misleading payout rates during the "demo" period. *Computers in Human Behavior, 21*, 153-158.

Shaffer, H. J. (1996). Understanding the means and objects of addiction: Technology, the Internet and Gambling, *Journal of Gambling Studies, 12*, 461-469.

Shaffer, H.J., Peller, A.J., LaPlante, D.A., Nelson, S.E., & LaBrie, R.A. (2010). Toward a paradigm shift in Internet gambling research: From opinion and self-report to actual behavior. *Addiction Research and Theory, 18*(3), 270-283.

Shih, T-H., & Fan, X. (2008). Comparing response rates from web and mail surveys: a meta-analysis. *Field Methods, 20*, 249-271.

Skitka, L.J., & Sargis, E.G. (2006). The internet as psychological laboratory. Annual Review of Psychology, 57, 529-555.

Shotton, M.A. (1991). The costs and benefits of "computer addiction". *Behaviour & Information Technology, 10*(3), 219-230.

Smeaton, M., & Griffiths, M.D. (2004). Internet gambling and social responsibility: an exploratory study. *CyberPsychology & Behavior, 7*, 49-57.

Souza, A. (2006). Re-conceptualizing the mobile phone - from telephone to collective interfaces. *Australian Journal of Emerging Technologies and Society, 4*(2), 108-127.

Taylor, R.J. (2003). *Casino crimes and scams* (pp. 121-130). New York: Vantage Press.

Thomas, A., Allen, F., & Phillips, J.G. (2008). *EGM problem gambling: The importance of escape and accessibility as gambling motivators.* Paper presented at the 18th conference of the National Association for Gambling Studies, Adelaide, December 3rd-6th, 2008.

Tung, L. (2007). *NAB floats denial-of-service threats to the cloud.* [downloaded 30th April 2009 from http://www.zdnet.com.au/news/security/soa/NAB-floats-denial-of-service-threats-to-the-cloud/0,130061744,339284465,00.htm]

Turner, A. (2008). *Australian internet filters have backdoor. Australian PC Authority.* [downloaded 28th April 2009 from http://www.pcauthority.com.au/BlogEntry/127342,australian-internet-filters-have-backdoor.aspx]

Turner, S. (2006). *Movieland.com sued for spyware.* [downloaded 5th February from http://blogs.zdnet.com/Spyware/?p=846]

US Attorney General (2007). Civil Action No. 98-5591 in the United States District Court of Pennsylvania. Final Adjudication. American Civil Liberties Union et al v Alberto R. Gonzales, US Attorney General. March 22, 2007. paragraph 138.

US Court of appeals No. 07-2537. American Civil Liberties Union et al v Michael B. Mukasey, US Attorney General. Argued: June 10 2008, Filed: July 22 2008.

US Government Accounting Office (2002). Internet gambling: An overview of the issues. [downloaded 24th April 2009 from http://www.gao.gov/new.items/d0389.pdf]

Varnhagen, C.K., Gushta, M., Daniels, J., Peters, T.C., Parmar, N., Law, D., Hirsch, R., Takach, B.S., & Johnson, T. (2005). How informed is online informed consent. *Ethics & Behavior, 15*, 37-48.

Wagenaar, W.A. (1988). *Paradoxes of gambling behaviour.* Hove, LEA.

Wajcman, J., Bittman, M., Jones, P., Johnstone, L.,& Brown, J. (2007). *The impact of the mobile phone on work/life balance.* ARC Linkage Project. [downloaded 20th May from http://polsc.anu.edu.au/staff/wajcman/pubs/Report_on_Mobiles_and_Work_Life_Balance_June_07.pdf].

Walker, M.B. (1992). *The psychology of gambling.* Oxford: Pergamon Press.

Wang, H., Lee, M.K.O., & Wang, C. (1998). Consumer privacy concerns about internet marketing. *Communications of the ACM, 41*(3), 63-70.

Warwick, K. (2002). *I, cyborg.* Essex: Century.

Watson, S., Liddell, P.Jr., Moore, R.S., and Eshee, W.D. Jr. (2004). The legalisation of internet gambling: A consumer protection perspective. *Journal of Public Policy & Marketing, 23*(2), 209-213.

Whitworth, B. (2005). Polite computing. *Behaviour & Information Technology, 24*(5), 353-363.

Wingfield, N. & Pereira, J. (2002). Amazon uses faux suggestions to promote new clothing store. *Wall Street Journal* (December 4).

Woerndl, W., Schueller, C., & Wojtech, R. (2007). *A Hybrid Recommender System for Context-aware Recommendations of Mobile Applications.* In proceedings of the IEEE 3rd International Conference on Web Personalisation, Recommender Systems and Intelligent User Interfaces (WPRSIUI'07), Istanbul, Apr. 2007.

Wolverton, T. (2001). *Yahoo still in porn business overseas.* [downloaded 24th April 2009 from http://news.cnet.com/Yahoo-still-in-porn-business-overseas/2100-1023_3-271108.html]

Wood, R.T., Williams, R.J., & Lawton, P.K. (2007). Why do internet gamblers prefer online versus land-based venues? *Journal of Gambling Issues, 20*, 235-252.

World Wide Web Consortium (2000). *Bridging the digital divide*. [Online]. Available:
   http://www.w3c.org

Wyatt, K. & Phillips, J.G. (2005). *Personality as a predictor of workplace Internet use*.
   Proceedings of OZCHI2005, ACM ISBN: 1-59593-222-4,
   http://portal.acm.org/dl.cfm.

Yampolskiy, R.V. & Govindaraju, V. (2008). Embedded noninteractive continuous bot
   detection. *ACM Computers in Entertainment, 5* (4), Article 7.

Yang, W.-S., Cheng, H.-C., & Dia, J.-B. (2008). A location-aware recommender system for
   mobile shopping environments. *Expert Systems with Applications, 34*(1), 437-445.

Young, K. (1996). Psychology of computer use: XL. Addictive use of the internet: A case
   that breaks the stereotype. *Psychological Reports, 79*, 899-902.

Young, K.S., & Case, C.J. (2004). Internet abuse in the workplace: New trends in risk
   management. *CyberPsychology & Behavior, 7*(1), 105-111.

Yuan, S.-T., & Tsao, Y. W. (2003). A recommendation mechanism for contextualized mobile
   advertising. *Expert Systems with Applications, 24*(4), 399-414.

Zhang, D.D. (2004). *Palmprint authentication*. Norwell, Mass.: Kluwer Academic
   Publishers.

4. The Outcome

Online gaming involves the transmission of a number of messages. As discussed previously, a proposal has to be available for the gambler to hazard a stake upon. The gambler then needs to be informed of the outcome of the gamble. The gambler may be informed of the outcome by the organisation hosting the initial proposition, or the outcome may be relayed by a third party (e.g. televised sports or racing). This section discusses factors influencing the fidelity of this process as occurring over the internet, mobile phone or digital television.

4.1 Importance of fidelity

This section outlines some of the reasons why the accuracy and fidelity of communications depicting sporting and racing events can be important to gambling. The provider of gaming may supply information as to the result of outcomes, or other parties may be involved where sporting events are under consideration. Where the provider of gaming supplies information as to the result of outcomes, the amount and quality of information may be at issue. There are limitations upon the amount of information that can be transmitted on the internet, mobile phone etc. These limitations mean there is a potential loss of fidelity when conveying outcomes of events in real time. This has meant that the internet was better suited to games involving static outcomes (e.g. sports and lotto wagering) (Toneguzzo, 1996a). The advent of broadband has to some extent offset this problem, but as will be outlined, it remains an issue.

The outcome of an event such as a horse race, the spin of a roulette wheel or the playing of a poker hand could historically only be directly observed by those actually at the event. Direct scrutiny by many people coupled with regulations outlining how such events were to be conducted helped ensure the outcome of those events were a matter of chance. Unscrupulous operators nonetheless found ways to manipulate those events (e.g. drugging, weighted balls, marked cards) so that the outcome was biased in their favour and so no longer a matter of chance (e.g. Gibson, 1976; Houdin, 1904; Maskelyne, 1894). The impact of such unscrupulous behaviour was however limited to those actually at the event.

With advances in technology it became possible to transmit an event from place to place making it no longer necessary for people to actually attend an event to know its outcome. However transmitted signals are not instantaneous nor are they impervious to incidental or deliberate interference and so are vulnerable to delay, corruption and loss once they leave the source. An incident in the early career of former US President Ronald Reagan provides an example of what can occur when the transmitted signal of an event is lost.

Prior to both his acting career and his Presidency, Reagan made his living as a radio announcer with one of his duties being to give accounts of Chicago Cubs base-ball games. On some occasions Reagan was not present at the actual game and so based his commentary on information relayed to him via telegraph (Reagan, 2003). In 1934 he was providing such a commentary on a game between the Chicago Cubs and the St Louis Cardinals when the telegraph line failed. Aware other stations were also broadcasting a play-by-play description of the game and that he would lose listeners to those stations if he suspended his account while awaiting restoration of the line, Reagan simply made up the play until the connection was reinstated. He later said of the event:

> …I took a chance. I had (Billy) Jurges hit another foul. Then I had him foul one that only missed being a homerun by a foot. I had him foul one back in the stands and took

up some time describing the two lads that got in a fight over the ball. I kept on having him foul balls until I was setting a record for a ballplayer hitting successive foul balls and I was getting more than a little scared.   Just then my operator started typing. When he passed me the paper I started to giggle – it said: "Jurges popped out [i.e. was caught out] on the first ball pitched (Reagan, 2003, p. 32).

The delay/loss of the telegraphic signal combined with Reagan's improvisation resulted in a clear lack of fidelity between the event as it was perceived by his listeners and the event as it actually occurred. That lack of fidelity could have resulted in punters listening to Reagan's account of the game and betting on Jurges' performance during the match, incorrectly suffering a loss.

While the signal loss experienced by Reagan was not deliberate and his actions not malicious, criminals are historically known to have relied on their ability to interfere with a transmitted signal in order to deliberately mislead punters for financial gain (Henderson, 1985). Nowhere was that approach more rife than in the town of Denver in the American state of Colorado in the early 1920's.

At that time underworld activities in Denver flourished under the leadership of Louis (Lou) Blonger. Over a period of time Blonger had corrupted police, local government officials and members of the judiciary to such an extent that they turned a blind eye to his activities. Such activities included prostitution, illegal gambling, drugs and bootlegging but his prime source of income was from "The Big Store Con". Protected by Blonger's influence and paying him a percentage of the "take" for that protection, conmen flocked to Denver over the summer months to perpetrate the con on unsuspecting visitors.

Although having many forms, the principle behind the "The Big Store Con" was always the same with a variation, called "The Wire", portrayed in the 1973 movie "*The Sting*" (Anatomy of a con, 2008). A visitor to Denver was befriended by a helpful stranger who would eventually introduce them to some form of illegal gambling occurring in a place whose patrons were in on the con and whose décor, fake and readily removable, lent *bona fides* to the operation.   In the case of "The Wire" such gambling might involve betting on horse races in a fake illegal sports betting venue. The visitor was told, for example, an employee of Western Union was leaving the company and wished to make some money before he left. His plan was to wait for a horse race where a long-shot won and then delay transmitting the results to the bookmakers long enough for the visitor to place a bet on the winning horse with the profits then shared between the visitor, the stranger and the Western Union employee. The visitor was encouraged to try the system by placing a wager at the fake illegal sports betting venue. The wager invariably returned a profit. Checking the results of the race in the newspaper that evening further convinced the visitor they were onto a "sure thing". Subsequent wagers were also profitable and so as the visitor's profit grew so too did their greed and their willingness to wager ever increasing amounts of money. Eventually of course the visitor lost, with those suspicious of the circumstances surrounding that loss (and not all visitors were) unlikely to contact authorities, since in doing so they would have to admit to participation in an illegal activity.

Blonger and 19 others of his "bunko gang" were eventually brought to justice by District Attorney Philip Van Cise in 1923 with Blonger dying in prison some five months after his arrival there. The case also resulted in the dismissal of the Denver Mayor and

cleansing of both the city administration and the police department (Maurer, 1999; Prendergast, 2008; Van Cise, 1936).

Technology has continued to advance since Blonger's time making it now possible for events such as horse races to be not only heard but seen as well, in real time, by people not at the event and even by people not in the country where the event took place. The event occurs, digital images are captured and those images transmitted World-wide. That approach potentially provides unscrupulous operators scope for altering the outcome of an event (Henderson, 1985; Taylor, 2003) as seen by people not present at the event, even though the event itself was scrutinised by many people and conducted in accordance with all appropriate laws and regulation. Without direct observation of the event or validation from an impartial source, remote observers cannot be sure the event they see accurately reflects the event as it occurred. They cannot be sure of the fidelity of the event.

In that context the issue of fidelity has at its heart the digitalisation of text, aural, and visual information. According to the Australian Communications and Media Authority (ACMA):

> …digitalisation reduces all data to bit streams that can be stored; manipulated for combining with other bit streams, divided into smaller components or otherwise modified; and transported in a manner that is indistinguishable from other bit streams (ACMA 2005-06 Comm Rep, p. 21)

One of the advantages of digitalisation is that it promotes the "convergence" of communications networks since it allows existing networks to acquire capabilities they were previously unable to handle efficiently. The copper voice network for example is now also able to deliver broadband internet services; subscription television networks can now offer interactivity and mobile phone services can now deliver content previously associated with broadcast television. A convergent communications platform then is one that is able to efficiently deliver all content, anywhere and at anytime with such a platform being one of the goals of emerging technology. Allied with a convergent communications platform is a "convergent device" that is, a device that will allow its user to efficiently display and interact with all content, anywhere and at anytime as well as interact efficiently with other convergent devices to allow for example, synchronisation of information (e.g. updating schedules) or data sharing. Such a device is another goal of emerging technology.

ACMA reported that "By 2005–06, most communication platforms have been fully digitalised or are in the process of being converted" (ACMA 2005-06 Comm Rep, p. 21). In light of the continuing technological dependence on digital information it is appropriate to discuss how fidelity may be influenced through the use of digital technology. In order to do that, it is first necessary to understand how digital data are produced from analogue data. As it is not the purpose of this work to provide a highly-detailed, technical explanation of the production of digital information a more-or-less conceptual approach has been adopted.

4.2 Analogue and digital data

The digital age has been said to have began with the discovery of the bi-polar transistor by William Shockley in 1948 and the subsequent development of the MOS-transistor in the 1960s (Bassett, 2007). Prior to the mid-1900s then, all information was recorded, stored or transmitted in analogue form. Analogue information consists of a theoretically infinite number of values with examples of such information including sine

waves (the waveforms representing human speech) and the signals from conventional television cameras.

The discovery of the transistor and subsequent technological advances such as the silicon chip, micro-processors and computers eventually resulted in the ability to record, store and transmit information in another way; digitally. Unlike analogue information, digital information consists of a limited number of discrete values expressed by the binary numbers 0 and 1 (called "bits").

An analogue signal can be converted to a digital signal in an electronic device called an analogue-to-digital converter (ADC). The process occurring within the ADC includes both "quantising" and "encoding". **Quantising** involves sampling rate (i.e. how often the analogue signal is sampled) and sampling precision (i.e. how accurately the analogue signal is sampled) and is the process whereby the continuous range of values in the analogue signal is approximated by a number of discrete quanta. Figure 4.1(a) for example represents an **analogue voice signal** over a period of three seconds. The green rectangles in Figure 4.1(b) represent an attempt to approximate that signal using a sampling rate of 4 samples/sec and a sampling precision involving 10 levels (i.e. 0-9). Every second then, the ADC samples the analogue signal 4 times and selects the value (quanta) within the range 0-9 which best represents the analogue signal at that time. The selected numbers (quanta) are shown along the bottom of Figure 4.1 (b).

Figure 4.1 – Analogue to Digital Conversion: (a) Analogue signal. (b) Approximation of analogue signal (green rectangles) using a sampling rate of 4 samples/sec and sampling precision involving 10 levels (0 – 9)
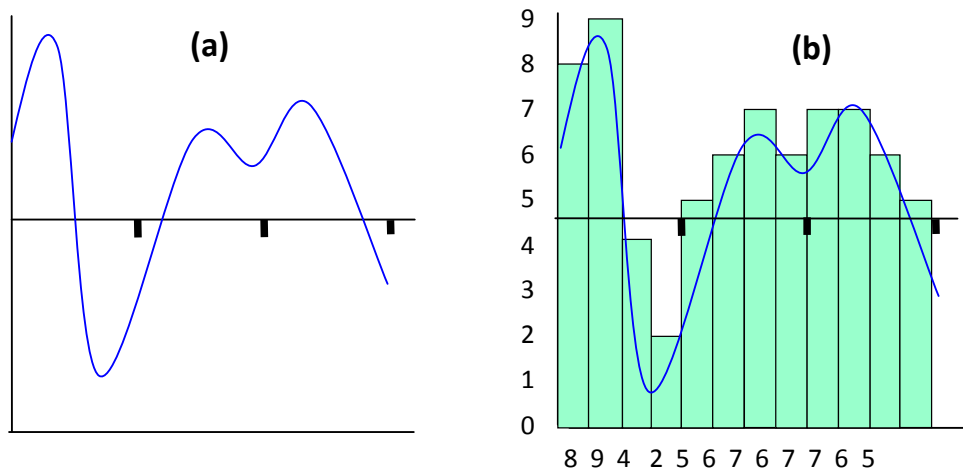
Encoding follows quantisation and is the process whereby the quanta are assigned a digital code (i.e. 0's and 1's) thereby becoming "bits" of digital information. Following on from Figure 4.1, the process can be envisaged as per Figure 4.2.

Quanta

Bits

| …7…6…5…2…4…9…8 |

…101…10…100…1001…1000

(5)   (2)   (4)   (9)   (8)
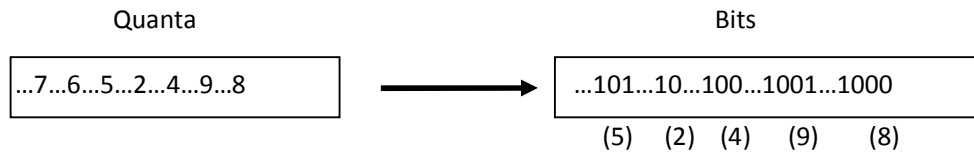
Figure 4.2 – Conversion of quanta to "bits" (binary numbers). The quanta are shown in brackets below their equivalent binary code

The bitstream is once again converted to an analogue signal through a digital-to analogue converter (DAC) which essentially reverses the process of the ADC. For audio analogue signals then, the fidelity with which the re-generated analogue signal matches the original is dependent on the sampling rate and sample precision used in the analogue-to-digital conversion process.

The conversion of an **analogue image** to a digital image also involves ADC's but is somewhat more complex. An analogue image exists in a 2-dimensional plane (height and width) that contains information in the form of variations in colour and brightness (intensity). In order to convert such an image into digital form those variations in colour and brightness, along with their location in the plane must be quantised and encoded. That is achieved by "sampling" the analogue image using a grid placed over the image and so dividing it into an array of small, individual picture elements called "pixels". As the number of pixels increases so too does the detail recorded in the digital image. For example, an image divided into a grid 640 pixels long x 480 pixels wide (and so containing 307,200 pixels) will look block-like and lack detail compared to the same image sampled using a grid of 1280 x 1024 pixels containing a total of 1,310,720 pixels.

Once having sub-divided the image into pixels, each pixel is examined and its intensity and colour quantised and encoded. The quantisation of intensity is straightforward and involves assigning an integer number proportional to brightness (see Figure 4.3). That integer number, a function of the sampling precision (i.e. number of levels) used by the ADC to represent brightness, is then converted to bits (i.e. 0's and 1's).
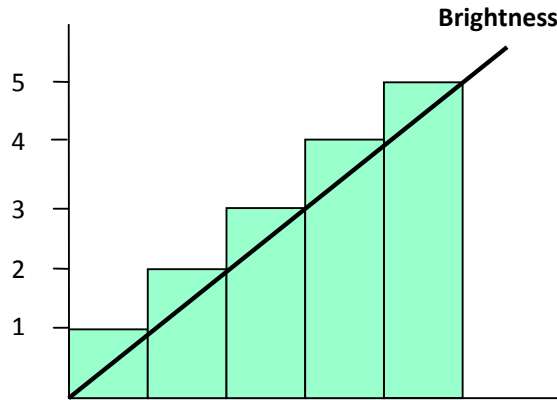
Figure 4.3: Quantisation of brightness. The integer numbers assigned to
the various quanta of brightness are subsequently converted to bits
(i.e. 0's and 1's) within the ADC.

The quantisation of colour is somewhat more complex and is dependent on how the image will ultimately be displayed: RGB (red, green and blue) for scientific applications, CYMK (cyan, yellow, magenta and black) for print applications and HSB (hue, saturation and brightness) for television. A detailed explanation of each scheme is beyond the scope of this work and so a conceptual approach to understanding colour quantisation will be adopted instead.

Conceptually then, any colour can be represented by a combination of the three primary colours red, green and blue. As a consequence, the colour of any pixel can be determined by the relative intensities of those colours within the pixel. If, for example, the intensity of the colour blue in a pixel is level 10 while that of both red and green is level 1, the pixel will appear blue. As the intensity of green increases (with the intensity of red and blue remaining unchanged) the pixel colour will eventually become yellow (at green level 10) and then increasingly green as the intensity of green continues to climb to higher levels. Specifying a pixel colour then can be achieved by, for example, assigning three quanta to that pixel; one for the intensity of red, one for the intensity of green, and one for the intensity of blue.

Since there is no limit to the number of possible colours, but a definite limit to the storage and processing capacity of computers, some restrictions must apply when assigning digital values to colour information. The number of colours a pixel can display is set by its "bit depth", that is the amount of bits made available to the pixel for storing information about that pixel. The more bits made available to the pixel for each of the colours red, green and blue the more shades of colours that pixel can display and so the finer the colour detail of the image. 24-bit colour for example (or "True" colour, the standard for PC monitors) assigns 8 bits each for red, green and blue. That allows 2^8 = 256 shades of red, 256 shades of green and 256 shades of blue giving a total of 256 x 256 x 256 = 16,777,216 million colours and so making the monitors colours appear "true" to the human eye. 24-bit colour then is superior to 16-bit colour (which assigns 5 bits each for red and blue and 6 bits for green giving a total of 2^5 x 2^5 x 2^6 = 32 x 32 x 64 = 65,536 colours) but not as good as 32-bit colour which gives a total in excess of 80 million colours.

Each pixel occupies a unique location on the grid and so its position can be specified and encoded. That location information in conjunction with the quantised and encoded colour and brightness values assigned to the pixels ultimately results in a bitstream that represents the image. As the number of pixels and "bit depth" increases so too does the picture fidelity with the result that a high-quality (high-fidelity) image requires a large amount of data to be stored. As an example, digitising and recording a standard video signal for digital playback at 640 x 480 pixels/frame in "true" 24-bit colour and displaying the images at the standard rate of 30 frames per second (fps), requires the processing of 640 x 480 x 3 (i.e. for the thee colours red, green, blue) x 8 (bits/colour) x 30 (frames per second) = 224 million bits /second. At such a rate a standard CD-ROM capable of storing 5200 million bits would hold only 23 seconds of video. Technological limitations then currently prevent data transfer at such high rates and so in order to display digital video it is compressed for storage and then de-compressed for display. File compression/de-compression is achieved using a "codec" and is not confined to video/image based data as audio codecs are also employed.

A codec is a device (hardware) or program (software) capable of compressing and/or decompressing a digital data stream. (The word "codec" derives from 'compressor-decompressor', 'coder-decoder', or 'compression/decompression algorithm'). Hardware codecs have advantages over software codecs in that, apart from reducing CPU load thereby allowing the performance of other tasks, device codecs are optimised for the quick decompression and display of data. For video data then, such codecs provide higher frame rates and larger images than purely software-based codecs.

Codecs can be classified as either "lossy" or "lossless". Lossy codecs achieve compression at the cost of fidelity whereas lossless codecs are typically used for archival purposes and store data in a compressed form while still retaining all the information in the original stream. It should be noted that as the cost of storage capacity decreases and network bandwidth increases there is a reduced need for lossy codecs for some media. Most commonly used video codecs are, however, lossy including MPEG-4 (part of ISO/IEC standard 14496-2), "Quicktime" (Apple's ITU-T H.264 compliant codec) and "WAV" (*Microsoft*'s Windows Media Video codec) and so using such codecs successively, as might occur for example when sending video files for repeated rounds of editing, is to be avoided.

"Loss" occurs, in part, because codecs are often optimised to emphasise important aspects of the media they were designed to encode. A codec designed to encode a sports event such as basketball for example needs to encode motion well but not necessarily exact colour or fine detail such as faces in the crowd. A video of an art exhibit on the other hand needs to perform well in encoding colour and fine detail such as surface texture but not motion.

Video images are generally not silent movies and so are usually accompanied by sound. Such images then contain both video and audio data and so comprise a "multimedia" data stream requiring the use of a multimedia codec to achieve compression/decompression. In addition to compressing/decompressing the video and audio data, a multimedia codec adds additional metadata to the stream to enable synchronisation of the video and audio data. For multimedia data to be useful in stored or transmitted form then, its three components (i.e. video, audio and synchronisation data) must be able to be correctly identified and successfully interleaved and that is achieved via a "container format" such as AVI (the

standard *Microsoft* Windows container), MP4 (the standard MPEG-4 container) and Matroska (an open source format).

A *Google* search on "multimedia codecs" reveals many free, open source audio and video codecs available for download as well as proprietary codecs available for purchase. The wide variety of codecs results in an equally wide variety of file types produced by those codecs including MPEG, JPEG and WAV. While most codecs support the basic operations required to display compressed audio and/or video digital data streams for many common file types, the sheer variety of codecs and their various versions can result in compatibility and obsolescence issues. This can be particularly problematic for multimedia data because the choice/availability of codecs and their optimisation characteristics (i.e. optimised for movement, colour, detail etc.) can result in each of the three data streams being handled by different programs, processes or hardware making accurate decoding and display potentially difficult if the recipient of the multimedia data has an incompatible/obsolete codec. Container formats too can be problematic since not all such formats are compatible with all codecs.

While the characteristics of the ADC/DAC's, codecs or container formats might vary, the end result of an analogue to digital conversion is a stream of bits comprising 0's and 1's that represent much, but not all, of the original analogue information. Despite the loss of information, digital signals have a number of advantages over their analogue counterparts. Specifically:

- They allow for more efficient storage of information. Although digital signals can have very high fidelity they do not contain as much information as the analogue signals from which they are derived, particularly if compressed via a codec. As a consequence more digital information than analogue information can be stored in the same volume.
- Digital signals are easier to transmit. When analogue signals become weak due to transmission loss it is difficult to separate them out from random transmission noise. Simply amplifying the signal also amplifies the noise. The well-defined (either 0's or 1's) and orderly nature of digital signals on the other hand makes them easier for electronic circuits to distinguish from noise. Once identified the signal can be amplified and sent on another leg of the transmission path.
- Compressed digital signals are more cost-effective to transmit since they allow more information to be sent in a given period of time when compared with analogue signals.
- Digital signals allow for perfect reproduction since the data will always be the same no matter how many times it is accessed as long as the numbers representing that data are not corrupted.
- They are more easily processed than analogue signals since microprocessors/computers "talk" and "think" in terms of binary data.

It is those properties of digital information that have seen its use extend beyond computers to devices such as mobile phones, music and video players, personal video recorders and digital cameras.

The efficiency with which digital information can be transmitted and the ease with which it can be utilised by microprocessors/computers makes the use of such information particularly appealing for telecommunications and it is those considerations that have resulted

in the world's communication systems converting to the pulse code modulation (PCM) digital transmission format.

While "0's" and "1's are well-suited to transmission over long distances, bitstreams themselves are not and so further processing of such signals is required.

4.3 Digital transmission and "packets"

In order to make efficient and cost-effective use of a telecommunications "line" – copper, optic fibre, or microwave – that line must be able to simultaneously carry a number of different digital signals. That cannot be achieved using a continuous bitstream since in order to ensure the end user receives all of the information contained in a particular stream, that whole stream would need to be transmitted before transmission of another stream could commence. The result would be the sequential, rather than simultaneous, transmission of digital signals.

To facilitate the simultaneous transmission of multiple bitstreams each individual stream is broken into smaller chunks called "packets". Packets from different streams can then be inter-mixed thereby allowing the simultaneous transmission of multiple streams. So that the individual bitstreams can be reconstructed and displayed at the receiving end such an approach requires, at the very least, that each packet associated with a particular bitstream is able to be recognised as belonging to that stream and that each recognised packet be sent to the same destination. Apart from containing the original bitstream ("payload") data then, packets also contain identifying data and may contain other data as well depending on the protocol used to send them. Of interest in this work are the Transmission Control Protocol (TCP) and the User Datagram Protocol (UDP).

TCP is one of the core protocols for transmitting data over the internet with its key feature being its ability to transmit data from the source to the destination and to receive information from the destination. TCP uses that feature to ensure data transmitted from the source is received by the destination. Due to network congestion, traffic load balancing and other unpredictable network behaviour packet transfer is not reliable and so packets can be lost or delivered out of order. TCP requires the sender to keep a record of each packet sent and for the recipient to acknowledge receipt of each packet before another is sent. In addition, the sender is also required to keep a timer from when each packet is sent. If that timer expires and the packet has not been acknowledged (i.e. timeout error), it is assumed to be lost/corrupt and so is automatically re-sent. TCP ensures lost packets are re-transmitted and out-of-order packets are correctly arranged before a perfect copy of the sent data are eventually displayed to the recipient. In short then, TCP guarantees the delivery and correct sequencing of all packets sent, however it does so at the expense of speed. Since it is optimized for accurate delivery rather than speedy delivery, TCP can experience delays of the order of seconds while it awaits the re-transmission of lost or out-of-order packets. TCP is therefore well-suited to relatively static applications like the world wide web but is unsuited to real-time applications like live streaming media over the internet (e.g. IPTV), Voice over Internet Protocol (i.e. VoIP), or online gaming.

UDP on the other hand is a far more minimalist transmission protocol. It transmits information in one direction only, from source to destination. It does not check to see if packets sent have arrived at their destination, if the destination is prepared to receive the information sent or even if the destination is still there. There is no concept of acknowledgment, re-transmission or timeout in UDP. As a result, UDP does not guarantee

reliability of delivery and so packets may arrive out of order, appear duplicated or be missing altogether. UDP applications then must be generally willing to accept some loss, errors or duplication in exchange for increased speed and efficiency when compared with TCP, and so UDP is best suited to applications that do not need guaranteed delivery. Such applications include live streaming media over the internet (e.g. IPTV), Voice over IP (i.e. VoIP) and real-time online games.

The use of codecs to compress data, high-speed modern-day electronics and telecommunications "lines" such as optical fibres ensure the data-rich packets quickly arrive at their destination. A single packet generally does not, however, contain enough information to be meaningful on its own and so displaying each packet as it arrives would be useless. Instead, as packets arrive they are temporarily stored in a "buffer" until more than enough packets have been accumulated to display something meaningful such as, for example, a complete frame of a movie. In the ideal situation as packets are removed from the buffer for processing and display, more packets arrive thereby guaranteeing the buffer always has enough data stored to ensure the recipient experiences continuity of display. As mentioned however, network behaviour can result in packets being lost/not arriving in time. In extreme cases packet loss can be so great the buffer is emptied faster than it can be filled, with the result that the recipient may experience "freezing" of an image on the screen as the system waits for sufficient new packets to arrive (regardless of the transmission protocol used) in order to generate the next image in the sequence.

Displaying web content on devices other than a PC presents problems since web content is optimised for display on a PC. This issue is usually overcome by the development of technical standards that are adopted World-wide. As an example, the Digital Video Broadcasting (DVB) consortium has developed DVB-Handheld (denoted by DVB-H) as the technical specification for bringing broadcast services to mobile handsets. However, even where standards exist, the device on which recipients view the data stream also affects the fidelity of the video image they see. Displaying detailed images on small screens such as those on mobile phones may result in loss of fidelity simply because the screen is too small for the user to easily resolve the detail displayed. Even viewing multimedia data streams on a PC can be problematic if using a PC whose hard drive, CPU, bus or video card cannot keep up with the high amount of data being transferred, the resultant video will appear "choppy" i.e. discontinuous with stops and starts or will be displayed very small.

While accepted standards exist for viewing web content on some devices, that is by no means the case for all devices. There are, for example, currently no standards for converting web content to TV content although attempts are underway. The DVB consortium for example, has identified DVB-HTML as a new markup language for specifying how Web pages should be organized for display on a digital TV. However, there is some doubt as to the suitability of that language to devices with poor computational capabilities. In addition, no official testing procedure exists for DVB-HTML, raising the risk of interoperability issues amongst various implementations. As a result, standard set-top boxes currently on sale do not yet support DVB-HTML and with other contenders in play such as ACAP-X from the ATSC's Advanced Common Application Platform(ACAP) and ARIB's Broadcast Markup Language (BML) it is unclear when a standard will be agreed on (Ferretti & Roccetti, 2006).

Regardless of the type of digital data (image, audio or multimedia) the fidelity of the data stream is affected by the sampling rate and sampling precision of the analogue-to-digital

converter (ADC) used. In addition to the ADC, other factors influence the fidelity of an image/multimedia data stream. Specifically:

- Pixel size.
- Bit depth: the number of bits made available to the pixel for storing information about that pixel.
- Codec: in terms of compatibility and optimisation characteristics.
- Container format
- Capability of the viewing media

When digital data are transmitted over a distance, fidelity may be further affected by packet loss, network congestion and transmission protocol. The impact of those factors then is that the event the viewer sees is not necessarily an accurate representation of the event as it truly appeared.

Discrepancies between how an event truly occurred and what a viewer sees are both commonplace and well-accepted. Many movies for example use stunts/special effects that appear to be real when they are not. Even live events can provide viewers with images that differ from the actual event. Common examples of such "augmented" images include scores being displayed over the live images of a cricket or football games and the moving line projected ahead of the leading swimmer during an Olympic event.

In the case of the movie stunt/special effect, the event is known by the viewer to be fabricated and not occurring in real time. Similarly, the visual appearance of current "augmentations" like the game score or moving line lets the viewer know they are fabricated and overlying real time images, but otherwise not affecting the accuracy of those images. That situation is however, likely to change.

Work on interactive augmented digital television has demonstrated an approach that allows content providers to insert information **into** the image data stream rather than the current approach of simply overlaying that data stream with information. Olaizola, Ĩnigo and Kammann (2006) reported being able to insert advertising banners and simple 3-D objects into the data stream from a live game of pelota (a traditional Basque ball sport played in a court by two or four players). The inserted banners acted like real banners in that they appeared to be behind players/objects that moved in front of them. Although currently in its early stages, such technology gives rise to a possible future where the remote viewers may not be aware of any discrepancy between how the event truly appears and what they see unless informed of such discrepancies by the content provider. It is for that reason that digital image authentication is an emerging issue (see Webber, 1999).

At this point it is necessary to differentiate between image fidelity and image "meaning" and that is best done by way of example. Let us suppose we have recorded and transmitted the roll of a dice that resulted in the winning face displaying four dots. Owing to analogue-digital/digital-analogue conversion, codecs, packet loss, transmission protocols, network congestion etc. the received images may contain less information than the sent images and so, for example, may have fewer colours, a less clear background and missing pixels. Some fidelity has been lost between sent and received images, but provided the received images clearly show the winning face as having four dots, the "meaning" of the received and sent images is unaltered despite the loss in fidelity. However, should the received images have fewer colours, a less clear background, be missing some pixels and

show the winning face as having **<u>three</u>** dots, both image fidelity and image meaning have been altered.

The difficulty with image authentication then lies not in reliably detecting changes to image fidelity, but in reliably detecting changes to image fidelity that effect image meaning (Rey & Dugelay, 2002). A further difficulty involves developing authentication techniques that are applicable to all of the image formats available (e.g. GIF, JPEG, WAV). Currently then authentication techniques cannot discriminate between differences in fidelity that alter image meaning and so may be the result of malicious manipulation, and incidental differences arising from encoding and transmission, that do not. As a result there is presently no generic, fool-proof method available to analyse a digital image and determine if its "meaning" has been altered or not.

Work in the area of image authentication currently focuses on the use of a "digital signature" and/or a "digital watermark". A digital signature involves a cryptographic "hash function", a "private key" known only to the user, an encoding algorithm and a "public key" freely available to the general public. The hash function uses data from the message itself to produce a "hash value" of fixed length regardless of the size of the message. A digital signature is obtained by encrypting the hash value using a mathematical algorithm that also requires knowledge of the user's "private key". The resulting signature is attached to the message and the message sent. Upon receipt the message is subjected to the original hash function and its hash value obtained. The digital signature is decrypted using the "public key" and the hash value associated with that signature obtained. The two hash values are compared and if identical the message is considered to be genuine since changes to the message would result in a hash value different to that of the signature (FIPS Publication 186-2, 2000).

Legal issues associated with digital signatures revolve around (Lim, 2002, September) establishing "integrity" (that the signature is attached to the intended document and hence the sender is aware of its contents), "authentication" (that the person sending the message is whom they purport to be), "confidentiality" (that the communication can be kept private) and "non-repudiation" (that the sender cannot avoid legal responsibility by claiming the signature was created by a fraudster).

Unlike digital signatures which are separate to the image, digital watermarks are inserted into the image. The watermark can be either related or un-related to the image, underlay the whole image or be inserted into various "blocks" of pixels within the image. Whatever the case, watermarks usually consist of minimal amounts of data that do not produce visible artefacts and so do not themselves alter the image. Image authentication is achieved by extracting and examining the watermark for distortions thereby identifying regions of the image that have been altered (Rey & Dugelay, 2002).

Difficulties common to both approaches are that they are not immune from attack (Buccafurri & Caminiti 2008; Fridrich, Goljan & Memon, 2000) nor can they reliably discriminate between deliberate tampering of the image and incidental image modification arising from, for example, the use of a lossy codec. Research addressing those issues continues with recent work involving JPEG images showing promise (Mendoza, Cruz, Nakano-Miyatake & Perez-Meana, 2008).

Issues associated with the production, transmission and fidelity of digital images has not gone un-noticed by gaming operators. Cassava Enterprises for example, a Gibraltar-based operator of an on-line casino offering "… gambling services via its in-house brands" states in its end-user license agreement:

> You agree that, in the event that the Software or Services fails to operate correctly as a result of, but not limited to, any delay or interruption in operation or transmission, any loss or corruption of data or communication or lines failure, any person's misuse of the Sites or its contents or any error or omission in content or any other factors beyond our control:

a.   the Company will not be responsible for any loss, including loss of winnings, that may result; and

b.   if any such errors result in an increase in winnings owed or paid to you, you shall not be entitled to the winnings falling within such increase. You shall immediately inform the Company of the error and shall repay any winnings credited to your account in error to the Company (as directed by the Company) or the Company may, at its discretion, deduct an amount equal to those winnings from your account or set off such amount against any money owed to you by the Company (Pacific Poker User Agreement, 2009, section 13, para. 6).

32 Vegas (also licensed in Gibraltar) states in its Terms and Conditions:

> 10.1.1.1 You may be using a connection or equipment which is slower than such equipment used by others and this may affect Your performance in time critical events offered via the Website, and

> 10.1.2 In relation to Your use of the Website, if You are betting on an "in running" event, You may not at any relevant time be able to see or otherwise be provided with the most up to date information in relation to the relevant event (Terms and conditions of use of www.32vegas.com ("the Website"), 2009).

Pokerstars (licensed in the Isle of Man) states in its end-user license agreement that:

> The User accepts that the historical data of each game shall be as recorded on the PokerStars servers. In the event of a discrepancy between the cards displayed on your computer and the game records on the PokerStars' server the latter shall prevail. The User accepts that the "Instant Hand History" feature of the Software shall not be considered as the official historical record of any hand (PokerStars Online Poker Software Terms of Service. End user license agreement, 2009, Section 11).

The numerous ways the fidelity of image/multimedia data can be affected and the current inability to reliably and easily authenticate received images provides unscrupulous operators scope to deliberately manipulate game outcomes as seen by remote observers. Knowledge of the factors influencing fidelity could lead to manipulations ranging from the simple to the complex.

A simple manipulation could, for example, be a game operator citing network congestion as the reason for him being unable to accept all bets on a winning horse. A more sophisticated approach might involve an operator compiling an archive of pre-recorded roulette games (for example) thereby allowing the operator to intersperse real-time games with archived games whose outcome is chosen to be the least wagered number for that spin. A complex approach might involve the artificial removal of packets from the data stream as

dice in a craps game are about to come to rest resulting in temporary buffer depletion and hence momentary freezing of the transmitted image at that crucial moment. The game operator could use that time to insert pre-recorded footage of less heavily wagered numbers appearing. They would be aided in that technique since frequent internet users are familiar with, and accepting of, such momentary "freezes". In addition, research indicates that most people may not be able to detect differences in the rates at which screen foregrounds and backgrounds are updated (e.g. Chow, Pose, Regan & Phillips, 2006). The combination of failure to notice and acceptance of momentary freezing as "normal" makes it unlikely users would question the outcome of the dice fall, especially if the operator employed the technique only occasionally. Regardless of how it was achieved, even infrequent manipulation of outcome could be of significant benefit to unscrupulous operators.

In summary then, the potential exists to manipulate the images/data stream of a live event that is being directly observed by many people, scrutinised by impartial witnesses as it unfolds and conducted in accordance with all relevant laws and regulations. That manipulation can result in the outcome of the event appearing different to people actually present at the event and those viewing it remotely. In light of the possible benefits to an event operator of such manipulations and the current difficulties associated with reliably discerning deliberate and malicious image tampering from incidental image modification, the possibility unscrupulous operators will engage in such manipulations cannot be discounted.

The ability of operators to record and transmit an event and of people to receive and view that event remotely is, in itself, only of partial interest to both gamblers and gaming operators. Of equal importance to both parties is their ability to interact in real time. Remote viewers must not only be able to view the event but to place a bet if they wish while operators must be able to accept that bet and pay winnings when appropriate.

4.4 Interactivity

Interactivity can currently be achieved using a number of technologies including PCs (through the internet), via television (through the telephone network e.g. *Foxtel*) or through games consoles and other devices (e.g. *TiVo*) that can access the internet, or by using mobile devices such as mobile phones to, for example, access the internet or enter an SMS competition.

4.4.1 Interactivity via a PC

Interactivity via a PC is achieved over the internet. When searching for information on the internet for example, user interaction is achieved by the user sending requests for information of interest from his PC to the world-wide-web and receiving responses to those requests from the world-wide-web back to his PC in return. Such interaction is accomplished by the interchange of packets between the user and the web and vice-versa. Just as network congestion, unpredictable network behavior and transmission protocol can result in packets sent from a game operator to a punter being lost or delivered out of sequence, those same features also affect the ability of packets sent from the punter reaching the game operator. Game operators can then cite network congestion/unpredictable network behavior for their inability to receive all bets on a particular event outcome. Punters could also claim network congestion/unpredictable behavior as the reason behind them being unable to place a bet on a winning horse seconds before race time and so perhaps claiming compensation.

4.4.2 Interactivity via Television

In conventional (i.e. non-interactive) TV information flow is structured along a one-way transmission model from a centre (i.e. TV station) to the audience and so lacks a feedback circuit. Interactive TV (iTV) on the other hand is structured along a two-way transmission model requiring information flow both to and from the audience with user information transmitted to the centre through a "return path" usually incorporated in dedicated technology such as a set-top box.

Interaction typically allows users to:
- Control programming e.g. pause live programming, automatically find and record every episode of a favourite show, find and record programs that feature a favourite actor, director, team or topic etc (see http://support.tivo.com.au/index.php?action=artikel&cat=1&id=35&artlang=en
- View additional information about the show the viewer is watching or ancillary information of interest such as news/weather/sports updates (BBC News, 2001, November 7).
- Buy Products and Services via the TV set. An everyday example is the ability to purchase a pay-per-view program with the click of a remote or to purchase items from home shopping programs by simply calling the advertised number and ordering the items.
- Vote or give an opinion. Some reality TV shows ask viewers to participate live with their show. A common example in Australia is viewers voting for a favourite entertainer in shows such as *Australian Idol* or *Dancing with the Stars.*

The profile of iTV users in Australia indicates them to consist of equal numbers of internet/computer savvy males and females (i.e. 50/50) aged 16-34 years. Of those households having iTV in Australia 39% of males, 29% of females and 23% of children aged 11-16 report it as being most useful (Kingsford-Smith, 2003, September 5).

Psychologically, it has been suggested iTV appeals to some people as it reduces "communication apprehension" (Gumpert & Drucker, 1992) that is, some people are predisposed to avoid communication if possible because to engage in it provokes anxiety (Beatty, Dobos, Balfantz, & Kuwabara, 1991). For others, the appeal of iTV is thought to lay in its ability to satisfy their impulsivity/immediacy tendencies with iTV viewers reportedly using their TV to purchase merchandise, live streaming, quizzes with high value prizes or cash, tickets to live events and interactive DVD with that trend common across all income brackets (Kingsford-Smith, 2003, September 5).

The degree of "immediacy" is however variable depending on how the return path is achieved. *Foxtel* digital set-top boxes for example have not all been provisioned with a return path facility and those that have use dial-up via PSTN (Public Switched Telephone Network) to return user information to the centre. In order for the user to vote or make a request (e.g. for a movie) using such an arrangement, the set-top box stores the data request and periodically tries the PSTN line to see if it is free before eventually dialing-up and sending the information.

The potential delay in accessing the PSTN and so responding in a timely manner to viewer information, in addition to such devices not allowing live streaming or true interactive DVD (although near-video-on demand may go some way in addressing the latter) makes it unlikely devices based on that technology will meet the impulsivity/immediacy requirements

of some users. There are, however, alternatives to a set-top box and the PSTN for achieving interactive television. Those alternatives involve the internet - a medium adopted by both *TiVo* and some games consoles such as *Playstation* - or a Short Message Service (SMS).

TiVo, owned in Australia by Channel Seven under a licensing agreement with the US-based *TiVo* company, is essentially a digital TV recorder with the additional capability of being able to access broadband internet. Although internet access via *TiVo* was initially restricted to sites controlled by *TiVo*/Channel Seven and so limited users to downloading upgrades to its electronic program guide (i.e. its internal system) or to setting the device to record any free-to-air television program airing in the next seven days, recent arrangements purport to allow users to access internet services including news, horoscopes, photo-sharing and to even order pizza (Sinclair, 2008, December 4)

While *TiVo* promises increased access to the internet, *Sony's* new *Playstation 3* already delivers such access. *Playstation 3* has a web-browser and so can be used to access any website the user wishes. However since the device is not a full-blown PC it does not have the same capabilities and so has some limitations when compared with a PC. Entering a URL for example involves an on-screen keyboard and is comparatively clumsy and time-consuming relative to an actual keyboard. Further, although users can access any site they may not be able to view the site if it requires plug-ins or the latest version of *Flash* (for example) to display properly since the *Playstation* is not upgradeable by the user to include plugins/latest version of *Flash*.

Microsoft's new *Xbox360* does not have a web-browser and so there is currently no ability for customers to access web-sites on their TV using that device. The device does however provide internet access to allow users to participate in on-line, multiplayer games or to download/purchase *Microsoft*-related products.

Another twist on iTV, and perhaps the least immediate, is interactivity through the use of SMS messaging. In that approach the user authorises the content provider to notify them via SMS when a program of specific interest is to be aired. The user can then choose to watch the program at the specified time or record it for later viewing.

In their review of SMS direct marketing and TV commercials, Trappey and Woodside (2005) reported that provided the information offered was of interest and relevant to the viewer as well as acceptable in terms of content, offering, timeliness etc., up to 29% of potential viewers (depending on their level of interest) who had agreed to be notified via SMS of the impending screening of a commercial or program of interest would indeed watch that commercial/program. Further, they reported awareness of brand/advertising strength to be 41% for an SMS-TV campaign and that 39% of people watched the channel since receiving the message, with 6% watching it on the day they received the message. 12% of respondents felt more positive about the show as a result of receiving the SMS and 29% reported themselves to be more likely to watch the channel again in future.

The potential for gambling via iTV has not gone unrecognised. Twoway Interactive Entertainment for example, an ASX listed Australian company that develops interactive media and gambling applications, reported at its AGM on 13 Nov 2008 having developed - in conjunction with Tabcorp Holdings Limited and *Foxtel* - "*Sky Racing Active*", an interactive TV wagering service applicable to both racing and sports betting applications with the underpinning technology suited to mobile and internet platforms as well as TV.

The company reported that *Sky Racing Active* began in Victoria on 28 April 2008 and in NSW on 7 October 2008 and that as of 9 November, despite limited advertising prior to the NSW launch, more than 8,500 Tabcorp account holders had used the service. Those account holders placed more than one million bets of average size $9- $10 and had increased the average number of bets per day from 2,000 in week 1 to almost 17,000 per day during Melbourne Cup week (week 28). It announced its future plans to include "actively seeking to deploy wagering service around Australia" and to increase revenue from its "Way2Bet" online and mobile wagering portal and "Way2Play", its interactive TV and online games service (ASX release, 2008, November 13).

Not surprisingly then, Twoway states:
> So far, iTV betting, gaming and lotteries have proven to be one of the more financially lucrative iTV applications. Indeed, it is coming to take its place alongside traditional online and telephone services as an important part of a three-pronged interactive strategy and is opening the door to fresh, hitherto untapped players. To this end, the interactive TV betting, gaming and lotteries market is facing a period of growth with the bulk of revenue generated by iTV bingo and casino-style games (Twoway Interactive Entertainment, Gambling, para. 2).

While "immediacy" and the limited capabilities of some of non-PC devices (e.g. *TiVo*/games consoles) might currently result in a poor interactive experience for the user, that is unlikely to remain the case. As the capabilities of microprocessors and telecommunications technology increases there is no impediment to set-top boxes/games consoles/*TiVo*-like devices/mobile phones etc. allowing users instantaneous access to any web-site at anytime from any location. In fact, there is a trend towards so-called "convergent devices" that is, a single device that performs the functions previously performed by a number of devices. The best known example of such a device is the mobile phone which now not only allows users to make and receive telephone calls anywhere at anytime, but also allows them to watch live (streamed) video, store and listen to their own music, browse the internet, be notified when they are within close proximity to friends and can act as a GPS, a scratch pad or even a source of information regarding the device owner's bio-rhythms.

4.4.3 Issues with interactive television: privacy

There is little doubt users of interactive television benefit from the interaction through having their immediacy, impulsivity and convenience needs met. Advertisers (and hence the providers of the service) also benefit from the interaction through knowledge about viewers gained via telegraphics. Telegraphics is a term used to describe the collection and analysis of TV viewer and interactive data (What is interactive TV? 2009). Each interaction - be it pausing or skipping through a commercial, ordering a movie or voting on reality TV – is recorded and stored for later analysis.

The purpose of such constant monitoring is to build up an understanding of the things that interest the viewer/the viewer's family at any given time so that advertising can be tailored to cater to those interests. As an example, consider a household with a young child as well as a parent interested in gambling. Through examining the history of programs selected for viewing in the late afternoon the TV station could conclude a primary-school-aged child lives at the house and enjoys watching such programs after school.

Advertisements sent to the house during those programs then would likely be most effective if they focused on things like toys, games, sweets and up-coming G-rated movies. Later in the evening the interaction history might indicate viewing behaviour to move from children's programs to more adult-oriented programs like *Top Gear* (a motoring program) for example. Appropriate advertisements might then include auto mechanics, car insurance, panel beaters, the latest Ford/Holden/Volvo etc. Following such programs and still later in the evening, interaction records show someone in the house has an interest in gambling and so advertisements for casinos, horse racing, on-line gambling venues, credit facilities and Gamblers Help are displayed.

Apart from providing targeted advertising, telegraphics also allows advertisers to monitor the effectiveness of an advertising campaign and "tweak" it accordingly as the campaign unfolds. Kingsford-Smith (2003) for example claimed the Los Angeles firm *Adlink*, which sells spot advertising on 44 cable networks seen by 3.5 million analogue and digital subscribers, in conjunction with advertising technology company Visible World, dynamically generated 93 versions of an advert for its 1-800-FLOWERS campaign by "optimising the creative (that is, the "package" being sold and the approach used to sell it), changing offer codes, price points, etc., and targeted these according to zip codes" (Kingsford-Smith, 2003, November 19, p. 3). The ad was created and presented, changes made and the impact of those changes monitored via telegraphics resulting in the ad being changed accordingly. In effect then, telegraphics provided a feedback loop that allowed advertisers to maximise the impact of their campaign on their target audience and tailor the ads according to demographic data associated with specific postcodes.

That ability to combine telegraphic data with direct marketing databases, demographic data and other information sources has the potential to "…offer the ability to segment households in a highly granular fashion" (Niemeyer, 2002, June 10, para. 2) resulting in advertisers/iTV service providers purportedly being able to create a detailed picture of a particular user and what motivates them (Burke, 2002).

The sale of telegraphic data and the subsequent airing of advertisements derived from that data provide revenue for the iTV service provider while the sales generated from the targeted advertising provide revenue for the advertiser. It was the desire to create individual, user-focussed targeted advertising that was reported to be one of the drivers behind Channel Seven's introduction of *TiVo* (McIntyre, 2008, July 1).

4.4.4 Interactivity via Mobile Phones

Interacting with an event operator via a mobile phone is perhaps the most familiar form of interactivity. Most people would be familiar with popular reality TV shows such as *Big Brother*, *Australian Idol* or *Dancing with the Stars* inviting people to vote for their favourite contestant/s via the Short Message Service (SMS). Other examples of mobile phone/SMS-based interactivity include users obtaining their daily horoscope (see http://www.miltonblack.com.au/ast/sms.htm), determining their "love compatibility" (users of the service phone a designated number, enter both their birth date and that of another person and subsequently receive an SMS providing information about their compatibility, Yahoo Press Release, 2003, January 7, para. 3), requesting jokes, quotes or trivia (see http://www.sms5050.com/infoservices/quote.php), requesting ringtones/wallpaper for their phones (see http://au.sso.dada.net/mobi/specialoffer_au1.html) and playing games for prizes (see http://www.head2headtrivia.com/TermsAndConditions.aspx).

The uptake of mobile phones in Australia has been rapid. In 2003-2004 there were 16.48 million terrestrial (i.e. excluding satellite) mobile phone services in operation in Australia. By 30 June 2007 the Australian Communications and Media Authority (ACMA) reported that number had reached 21.26 million thereby exceeding the total Australian population. For the first time then, there was more than one such service for every Australian with 68.9 % of users aged 14 to 65+ years claiming to have sent an SMS in the previous four weeks (ACMA, 2006-2007a).

The most recent figures available for SMS usage are those from 2004-5. In that time 6.74 billion SMS messages were sent representing an increase of 33 per cent over the previous year. That increase was attributed to an increasing number of premium rate mobile services including voting on interactive TV shows, downloading of ringtones and SMS 'chat' (ACMA, 2004-2005)

SMS-based interactivity with an event operator usually involves both the content provider and an SMS "aggregator". The provider wishes to make their product available to all mobile phone users and to receive payment for that product regardless of the carrier (i.e. *Telstra, Optus, Vodafone, Hutchison "3"*) used by the phone's owner. The primary role of the aggregator then is to make available to the content provider the technical connections to each SMS carrier and to ensure the quality of service of those connections in addition to establishing contracts, obtaining permits, providing billing directly from the user's account etc. In addition, since aggregators enter into formal relationships with carriers to purchase bulk SMS's, those messages are allowed to pass through the carrier's system unhindered and are not flagged as spam and terminated by the carrier as would normally occur for bulk SMS's sent from one source.

The cost of sending a standard 124 character SMS in Australia (consisting of about 140 bytes of data) is currently 25 cents. There is no cost for receiving the message. Organisers of promotional games (i.e. games promoting goods or services) in Australia requiring contestants to enter via a phone call or SMS are prohibited from receiving all or part of the cost of entry (i.e. the cost of the call/SMS) and the carrier is prohibited from charging more than the prevailing rate of the service. Such games then do not generate a profit for the organiser, but rather for the service provider since the cost to the carrier of sending an SMS is reported to be a fraction of a cent making SMS's "byte-for-byte one of the most expensive forms of data transfer" (Paget, 2008, February 2, para. 5).

Operators offering mobile phone customers interactive services such as daily horoscopes and "love compatibility" are not running a promotional game and hence by-pass the restrictions associated with those games. They are therefore able to receive part of the "cost of entry" (i.e. the SMS charge) and so can be funded via that charge. They have been aided in that endeavour by Mobile Premium SMS.

Mobile Premium SMS is an ACMA approved scheme covering premium SMS services using telephone numbers with the prefix 191, 193, 194, 195, 196, 197, 199, or through mobile phone network portals (TSP Determination No. 1, 2005).

BlueCentral - a hosting and mobility solutions provider- offers its clients, amongst other services, aggregation and Premium SMS. It states that:
> Premium SMS is typically used for consumer services where the end user pays for a
> product or service. It allows a business to charge more than the standard SMS cost to

a consumer on a specific number and then retain a portion of the extra charge as revenue. The transaction is billed directly to their mobile handset appearing on their mobile bill or deducted from their prepaid credit. Premium SMS enables mobile micro payments to be processed with ease (Blue Central, 2009, para. 2).

Unlike standard SMS where customers are charged to send, but not to receive, a message, Premium SMS allows operators to charge customers more than the current 25 cents per message to send and/or receive an SMS. No maximum charge has been set for a Premium SMS with the Australian Mobile Telecommunications Association (AMTA) stating "The pricing of premium SMS/MMS services is determined by the provider of the premium service and **by law must be clearly stated in any advertising for the service**" (AMTA, 2008, October, p. 2).

Message Originating (MO) SMS, like standard SMS, allows operators to *charge users for messages sent* by the customer, however the amount charged can exceed 25 cents per message. Unlike a standard SMS which can experience delay between being sent and being received, BlueCentral claims messages sent using its MO service "…are received in real-time and are commonly used for interactive TV voting, competitions, on pack promotions…"(Blue Central, 2009, para. 5).

Message Terminating (MT) SMS - also called reverse billing - is unique to Premium SMS and allows operators to *charge users in excess of 25 cents for each message received* from the operator. BlueCentral claims common applications of that service include "…mobile content, subscription services, alert and information services, horoscopes and chat" (Blue Central, 2009, para. 6).

The ability to charge users for SMS's received resulted in the scam of 'missed call marketing' whereby operators would make a large number of very short duration calls to mobile phones resulting in the recipient receiving a "missed call" message. Accessing the message resulted in a charge to the recipient with part of that charge going to the scam operator. ACMA reports undertaking ongoing investigations of companies involved in that activity with the result those companies have ceased their activities (ACMA, 2006-2007b).

4.4.5 Blocking mobile phones
Mobile phones are actually radios. Unlike the internet they can be jammed by broadcasting on similar frequencies (http://en.wikipedia.org/wiki/Mobile_phone_jammer). France attempted to jam phones at their Opera house, but this was discontinued because jamming was indiscriminate and interfered with their use for emergency purposes (http://www.fiercemobileit.com/story/problem-jamming-mobile-phone/2009-05-13). Personal mobile phone jammers are available, with their capability varying with the size of the device (http://www.globalgadgetuk.com/Personal.htm). Mobile phone jammers tend to be illegal, and are typically used by security forces or in prisons.

4.5 Interactivity and Gambling
Advances in technology and the ability of people to use different technologies to interact remotely with an event has led, not surprisingly, to the creation of "events" that were previously not possible. Buying merchandise through a TV, real-time SMS voting for a favoured contestant or determining "love compatibility" from a mobile phone are examples.

As new technologies and capabilities emerge they can get ahead of legislation, a situation confronted by the British Government in relation to "participation TV".

4.5.1 Television and mobile phones

In mid-December 2006 the British Office of Communications (Ofcom) released an issues paper seeking "pre-consultation" regarding the regulation of participation TV. Responses to the paper were to help inform the formal consultation to be undertaken in 2007. In that paper participation TV was referred to as:

> …those television services (including but not limited to dedicated channels) that rely wholly or mainly on viewers paying for an opportunity to participate in the service. These services tend to be dominated by repeated messages to viewers – verbal or in on-screen graphics (usually both) – to call a premium rate number. This content may take a number of forms, including quiz services, adult chat, psychic readings and dating (Ofcom, 2006, para.1.2).

The concern with participation TV was that:

> Viewers are often repeatedly encouraged to spend money to interact with the television service; however, they may not always fully understand the charges involved or indeed what they are getting in return. Of the Participation TV genres, TV quiz services tend to generate the most concerns from viewers. In November 2006, quiz services were the subject of a Culture Media and Sport Select Committee inquiry. Ofcom, ICSTIS and the Gambling Commission were among the parties asked to provide submissions (Ofcom, 2006, para. 1.4).

Typically the format of quiz shows required some form of skill, albeit of a low level. Viewers might, for example, be asked to solve a simple anagram or to state the sum of a list of figures. The primary concern in relation to quiz shows was not however the level of skill involved, but rather the method of entry. Viewers watching the live broadcast take part by sending an SMS or making a premium rate telephone, with the broadcaster keeping a proportion of that SMS/call as revenue. Free entry via the internet is also usually offered as an alternative form of entry.

Although all viewers responding to the advertised premium number were charged for the SMS/call, a computer randomly selected those to be put through to the studio or to proceed to the next stage where another random selection was made. Viewers were not made aware of the odds of getting through to the studio. Such behaviour resulted in the British Parliament House of Commons Culture, Media and Sport Select Committee on Call TV Quizshows stating:

> ….statutory regulators are struggling to keep up with a new genre; the shows themselves have the look and feel of gambling but are not presently regulated as such; and Members of Parliament are receiving complaints from people who see the shows as "a rip-off" (House of Commons Culture, Media and Sport Select Committee, 2007a, Summary, para. 1).

That report further noted that:
- Owing to a lack of transparency regarding the cost of entry, the financial impact of participating in such shows could be "substantial" leading to bills over five times normal usage.

- Participation in the quizzes is compulsive for some viewers with one viewer reporting having made 60 calls in an eight minute period. There was however no consistent evidence such shows could become addictive in the long term.
- The late night/early morning nature of the programs had the potential to exploit the lonely, tired or inebriated and this view is reflected in the literature (Griffiths, 2007).
- A significant proportion of callers came from the socio-economic group least able to afford premium rates, potentially lured into entry by the promise of winning a large sum of money that could transform their life.
- Some games "…test the boundaries of fairness [i.e. would a reasonable person be able to get to the answer ?] and, in our opinion, occasionally transgress them". An example given was when participants were asked to name an item that might be found in a lady's handbag. The response eliciting the highest prize value was "rawlplugs" on the basis the owner of the handbag may have been a decorator.
- Some games "…use methodologies which are almost impossible for a viewer to discern", are not required to be assessed as "fair" and which the producers are not required to disclose on air as it may be commercially sensitive. An example given is where viewers might be asked to count the number of "reds" in a paragraph unaware the solution may involve the number of instances of the occurrences of the letters "r", "e" "d" and "s" in succession, not in succession, in reverse order and as a part of a longer word.
- The legislative status of Call TV quiz shows is unclear, as is their status as a lottery.

In their joint response to that report the regulating bodies of the Office of Communication (Ofcom: responsibilities include regulating the editorial standards in programming, ensuring all regulatory responses are properly co-ordinated and that there is an appropriate range of organisations and rules to protect consumers) and the Independent Committee for the Supervision of Telephone Information Services (ICSTIS, the watchdog for premium rate services since renamed PhonePayPlus, responsible for the code under which premium rate services operate and the day to day regulation of the promotion and operation of such services) noted that the heart of the issue with premium rate services "…is directly concerned with the issue of trust between broadcaster and audience…" (House of Commons Culture, Media and Sport Select Committee, 2007b, Appendix, para. 4).

The Government's response to the select committees findings was presented to the British Parliament on 26 March 2007 and included (Government Response to the Culture, Media and Sport Select Committee Inquiry into Call TV quiz shows, 2007):
- Statements regarding the loss in trust between broadcasters and their audience in relation to a number of interactive TV shows and the importance of trust to "The tradition of broadcasting in this country…" (p.1, para. 3).
- Recognition that regulation of call TV quiz shows was inadequate partly because legislation had not yet been drafted with that new genre of TV program in mind. As a consequence regulation of that genre required closer liaison between, and input from, three existing bodies; the Office of Communication (Ofcom), the Independent Committee for the Supervision of Telephone Information Services (ICSTIS, the watchdog for premium rate service since renamed PhonePayPlus) and the Gambling Commission.
- The view that while some TV quizzes had many of the characteristics of gambling: People calling a television station to enter a competition are not playing a game of chance merely because it is a matter of chance whether or not their telephone call is answered (whether they get the opportunity to answer the question). It is merely the

first stage in the competition, and a pre-requisite to them entering. They are paying for the opportunity to participate. In some circumstances, the payment for this opportunity will amount to a lottery (p.4. para. 23).

In such cases the government felt the Gambling Commission had sufficient power to prosecute breaches of the rules applying to lotteries and would be aided in that by changes to the Gambling Act (2005) which strengthened the definition of a lottery (due to come into force on 1 September 2007)

- A "Statement of Expectations for Call TV Services" from ICSTIS (ICSTIS, 2007)

Dubious game methodologies and entry procedures are not the only issues associated with interactive TV and audience participation.

On 27 November 2006 the BBC children's program "*Blue Peter*" hosted a live fundraiser for children orphaned by AIDS in Malawi. More than 13,800 people called in to attempt to identify a mystery celebrity's shoes. The calls cost 10p each which included 3.25p for the Unicef charity (BBC News, 2007, March 14). A technical problem resulted in callers being unable to reach the studio and so a junior researcher selected a child from the audience who had seen the celebrity in the studio and had that child pose on-air as the winner. The deception was uncovered when a guest present at the studio on the day of the competition subsequently contacted the BBC and raised questions about the competition. Ofcom's investigation of the matter resulted in the imposition of a £50,000 on the BBC, citing the severity of the fine reflected the fact that the BBC had deliberately misled a child audience, had shown a lack of regard for the welfare of the child posing as the winner and that its actions "…go to the heart of the relationship of trust between the broadcaster and its audience" (Ofcom Content Sanctions Committee, 2007, July 9, p.2, para 1.7)

Pre-selection of finalists before entries had closed or based on their geographic location, selecting winners for "editorial" reasons (i.e. they would offer the most entertaining program), because of their suitability to be on television (e.g. how articulate or lively they were, their likely onscreen reaction to winning) or because they were known to the production team resulted in Ofcom imposing a £3,000,000 fine on LWT (Holdings) Limited for unfair conduct in various viewer competitions appearing on "*Ant & Dec's Saturday Night Takeaway*" from 2003-2006 (Ofcom Content Sanctions Committee, 2008a, May 8).

In relation to programs where viewer entry constituted a vote for a particular contestant, a number of irregularities processing votes have led to fines. In one case tallies were made before voting had closed, with the TV station overriding viewers' song choices in an effort to maintain a suitably wide musical balance within episodes. This resulted in Ofcom imposing a £1,200,000 fine on Granada Television Limited for its January 2007 production of "Soapstar Superstar", a show allowing viewers to vote on the singing of various popular soap opera stars (Ofcom Content Sanctions Committee, 2008b, May 8). Once again Ofcom cited "…a grave breach of the trust between a long-standing public service broadcaster and its audience..." (p. 24, para 10.16) as a significant contributor to the magnitude of the fine.

Similar schemes existed in Australia, and have also generated complaints in terms of disclosure of odds (http://www.dtvforum.info/lofiversion/index.php/t42059.html), and the strange or inappropriate answers to questions (http://www.tvtonight.com.au/2007/06/quizmania-makes-way-for-the-mint.html). These

programs were subsequently taken off the air (http://www.tvtonight.com.au/2007/11/no-bingo-and-no-mint-either.html).

4.5.2 Internet

The internet also offers users the opportunity to gamble, with researchers reporting internet gamblers to be more likely to have a gambling problem or more likely to develop a gambling problem than non-internet gamblers, although it is unclear if internet gambling leads to a gambling problem or if people with gambling problems are drawn to the internet (Wood & Williams, 2007).

The number and variety of games available to be played online is huge. The internet portal *Online Casino City* for example provides links to over 2,000 online gaming sites with over 1,800 of those purported to be English language sites accepting play from Australia. Sites on offer include 623 online casinos, 471 online poker rooms, 336 sportsbooks, 258 online bingo games and 11 online backgammon games (see http://online.casinocity.com/).

Little work has been done on the characteristics of people who gamble on the internet and why they prefer that mode to land-based venues. One such article however sheds some light on those factors but cautions readers against over-generalising the findings because of the limitations of the study. Wood, Williams and Lawton (2007) conducted an online survey of 1,920 internet gamblers. They found that:

- 42.7% of respondents were classified as "moderate" or "severe" problem gamblers according to the Canadian Problem Gambling Index.
- Respondents reported spending an average of 5 hours per week gambling on the Internet with the median weekly time reported as 2 hours.
- Computer savvy, well-educated males with higher than average incomes preferred gambling on the internet.
- The online game most often played was slots/Video Lottery Terminals (i.e. electronic gaming machines, 40.9%), followed by cards (mostly blackjack, 33.3%) and keno/bingo (14.4%).
- Problem gamblers were *less* likely to prefer Internet gambling than non-problem gamblers. The authors suggested that result may be because problem gamblers use online services when their preferred land-based gambling venues are unavailable (e.g. closed) or because their gambling problem compels them to access all forms of gambling whether they prefer it or not.
- The three primary reasons given for preferring internet gambling over land-based venues were convenience (the internet is always available), ease (the sites are easy to find, join and play) and comfort (being able to play in the comfort of one's own home without restrictions e.g. a dress code). Other factors included the feeling of having more privacy online, a dislike of the "sorts of people" encountered at a casino and the ability to control the speed of play resulting in a more fast-paced or leisurely experience than is available in land-based venues,
- Very few people (1.8%) claimed to prefer internet gambling because they felt the potential winnings were higher or potential losses were smaller (3%), a somewhat surprising result given many online gaming sites reportedly inflate payout rates during demonstration sessions of the games but do not maintain those rates once play has commenced "for real" (Sévigny, Cloutier & Ladouceur, 2005).

4.6 Fidelity and the outcome for gamblers

Where the outcome is conveyed by another party there are other implications for gaming. As has been outlined, there are delays in the transmission of sporting events associated with buffers and packet loss (on *Foxtel* it is of the order of seven seconds). This is relatively trivial, but it may contribute to other problems. Suspension or reversals of outcome on the basis of appeal have occurred, and can have implications for the conduct of gaming. Historically sporting events were conducted according to the rules governing that sporting event, and thus their conduct may not consider the implications of their rulings for gaming activities. In the infamous "Sirengate" incident, the AFL allowed 15 seconds of extra play in a match between Fremantle and St Kilda in Launceston. Although Sportsbet paid punters for the initial decision for the match, AFL's reversal of the decision lead to complaints by losing punters and legal challenge as to their loss of earnings (see http://www.news.com.au/perthnow/story/0,,23977029-5005401,00.html). Given the implications for sponsorship and lost revenues more care will be necessitated in areas that are potentially subject to human error (see http://www.foxsports.com.au/story/0,8659,24099208-23209,00.html).

4.7 Summary

The converging capability of electronic devices means that gambling will soon be accessible on any web capable device, interactive television or mobile phone. Unlike gambling that occurs face-to-face, gambling on events on the other end of a communication channel potentially puts the consumer at a disadvantage. Unless there are guarantees or checks upon fidelity, misrepresentation can occur, and consumers have been scammed on mobile phones and television. A variety of audience participation schemes have already tested markets and garnered revenues in the UK. Problems with the fidelity of game shows, or the conduct of sporting events have generated dispute, legal challenge, and fines.

4.8 References

ACMA. (2004-2005). Australian Communications and Media Authority. Telecommunications Performance Report 2004-2005.

ACMA (2005-06). Australian Communications and Media Authority, Communications Report.

ACMA. (2006-2007a). Australian Communications and Media Authority. Communications Report 2006-2007.

ACMA (2006-2007b). Australian Communications and Media Authority. Annual Report 2006-2007. Chapter 3. Regulatory tools, Content regulation & Anti spam activities.

AMTA. (2008, October). Australian Mobile Telecommunications Association Tip Sheet: Mobile Premium SMS/MMS Services. Ringtones, games, music, sport, voting, chat, news…. What, when, why and how much? Retrieved January 16, 2009 from http://www.amta.org.au/amta/site/amta/downloads/pdfs_2008/Mobile%20premium%20servic es%20.pdf

Anatomy of a Con: The Wire. (n.d.) Retrieved December 4, 2008, from http://www.blongerbros.com/gang/wire.asp

ASX release (2008, November 13). Twoway Interactive Entertainment. AGM Chairman's Address & CEO's Presentation. Retrieved 16 January 2009 from http://www.twowaytv.com.au/pdf/asx_releases/ASX_Release_AGM_Presentations_1 3Nov08.pdf

Bassett, R.K. (2007). *To the Digital Age: Research Labs, Start-up Companies, and the Rise of MOS Technology*. Baltimore Maryland: Johns Hopkins University Press.

BBC News. (2007, March 14). Sorry for fake winner. Retrieved 9 October, 2008 from http://news.bbc.co.uk/1/hi/entertainment/6449919.stm

BBC News (2001, November 7). BBCi heralds new interactive era. Retrieved August 7, 2008 from http://news.bbc.co.uk/1/hi/entertainment/1643259.stm

Beatty, M.J., Dobos, J.A., Balfantz, G.L., & Kuwabara, A.Y. (1991). Communication apprehension, state anxiety and behavioural disruption: A causal analysis. *Communication Quarterly, 39*(1), 48-57.

Blue Central. (2009). Mobile Billing. Retrieved October 2, 2009 from http://www.bluecentral.com.au/mobile-billing/

Buccafurri, F., Caminiti, G., & Lax, G. (2008). Signing the document content is not enough: A new attack to Digital Signature. *Proc. of the IEEE International Conference on the Applications of Digital Information and Web Technologies, Czech Republic*, 520-525.

Burke, D. (2000). *Spy TV.* Pub: Slab-O-Concrete.

Chow, Y-W., Pose, R., Regan, M., & Phillips, J. (2006). The effects of HMD attributes, different display and scene characteristics on human visual perception of region warping distortions. *International Journal of Virtual Reality, 5*(3), 1-10.

Ferretti, S., & Roccetti, M. (2006). MHP meets the Web: Bringing Web contents to digital TV for interactive entertainment. *Proceedings of the 8th IEEE International Symposium on Multimedia, USA*, December.

FIPS Publication 186-2 (2000). U.S. Department of Commerce/National Institute of Standards and Technology. Digital Signature Standard (DSS). Federal Information Processing Standards.

Fridrich, J., Goljan, M., & Memon, N,D. (2000). Further attacks on Yeung-Mintzer fragile watermarking scheme. *Proceedings of the Society of Photographic Instrumentation Engineers (SPIE), 3971*(1), 428-438.

Gibson, W.B. (1976). *The bunko book*. Las Vegas: Gamblers Book Club.

Government Response to the Culture, Media and Sport Select Committee Inquiry into Call TV quiz shows (2007). Session 2006-07. Presented to Parliament by the Secretary of State for Culture, Media and Sport 26 March 2007. Retrieved 9 October, 2008 from http://www.culture.gov.uk/images/publications/calltvquizshowCm7072.pdf

Griffiths, M. (2007). Interactive television quizzes as gambling: A cause for concern? *Journal of Gambling Issues, 20*, 269-76.

Gumpert, G., & Drucker, S.J. (1992). From the agora to the electronic shopping mall. *Critical Studies in Mass Communication, 9* (2), 186-200.

Henderson, M.A. (1985). *How con games work*. Secaucus NJ: Citadel Press.

Houdin, R. (1904). *Card sharpers*. Las Vegas: Gamblers Book Club.

House of Commons Culture, Media and Sport Select Committee. (2007a).   Call TV Quizshows. 3rd Report. Printed 17 January 2007. Retrieved 3 October, 2008 from http://www.publications.parliament.uk/pa/cm200607/cmselect/cmcumeds/72/7202.htm

House of Commons Culture, Media and Sport Select Committee. (2007b).   Call TV Quizshows. 4th Report. Appendix: Joint response from Ofcom and ICSTIS to the Committee's Third Report of Session 2006-2007. Printed 27 March 2007. Retrieved 3 October, 2008 from
http://www.publications.parliament.uk/pa/cm200607/cmselect/cmcumeds/428/42802.htm

ICSTIS (2007). Call TV Quiz Services Review: Revised Statement of Expectations for Call TV Services. A statement by the Independent Committee for the Supervision of Telephone Information Services (ICSTIS). Issued 4 April 2007. Retrieved 9 October, 2008 from http://www.phonepayplus.org.uk/pdfs_consult/calltvquiz_soe.pdf

Kingsford-Smith, I. (2003, September 5). Value added television: Multi-device enhanced TV. Retrieved August 8, 2008 from http://www.broadcastpapers.com/whitepapers/IKSValueAddedTV.pdf?CFID=35329187&CFTOKEN=274ec3b688f44ad9-66CAF0E0-D576-AD99-7F416C4BED2143EF

Kingsford-Smith, I. (2003, November 19). Turning viewers into direct leads without a set-top box.   Retrieved August 8, 2008 from http://www.broadcastpapers.com/whitepapers/Interactive-TV-Advertising-Turning-Viewers-into-Direct-Leads-without-a-Set-Top-Box.cfm?objid=32&pid=180&fromCategory=45

Lim, Y.F. (2002, September). Digital signature, certification authorities and the law. *E-Law: Murdoch University electronic Journal of Law, 9*(3). Retrieved August 7, 2008, from ttp://www.murdoch.edu.au/elaw/issues/v9n3/lim93.html

Maskelyne, J.N. (1894). *Sharps and flats*. London: Longmans, Green & Co.

Maurer, D. (1999). *The Big Con. The story of the confidence man.* New York: Anchor Pub.

McIntyre, D. (2008, July 1). Seven to bring TiVo to Australia this month. Retrieved 8 August 2008 from http://www.news.com.au/technology/story/0,,23952292-5014108,00.html

Mendoza, J.A., Cruz, C., Nakano-Miyatake, M., Perez-Meana, H. (2008). Content Authentication Schemes for Digital Images. *Proc. of the 5th International Conference on Electrical Engineering, Computing Science and Automatic Control, Mexico*, 292-297.

Niemeyer, B. (2002, June 10). Visible World's "Build On The Fly" TV Ad Customization & Targeting. The Niemeyer Review. Retrieved August 14, 2008 from http://www.centrimedia.com/archives/2002_06_10_VisibleWorld.html

Ofcom. (2006). Participation TV: How should it be regulated? British Office of Communications Issues Paper. Published 15/12/06. Retrieved 3 October, 2008 from http://www.ofcom.org.uk/consult/condocs/participation/participation.pdf

Ofcom Content Sanctions Committee, 2007, July 9). Retrieved 9 October, 2008 from http://www.ofcom.org.uk/tv/obb/ocsc_adjud/bbc.pdf

Ofcom Content Sanctions Committee, 2008a, May 8). Retrieved 10 October, 2008 from http://www.ofcom.org.uk/tv/obb/ocsc_adjud/lwt.pdf

Ofcom Content Sanctions Committee, 2008b, May 8). Retrieved 10 October, 2008 from http://www.ofcom.org.uk/tv/obb/ocsc_adjud/granada.pdf

Olaizola, I.G., Iˉnigo, B. M., & Kammann, T.D. (2006): MHP oriented interactive augmented reality system for sports broadcasting environments. *Journal of Virtual Reality and Broadcasting*, *3*(13).

Pacific Poker User Agreement (2009). Retrieved April 4, 2009 from http://www.pacificpoker.com/en/online-poker-fairness/User-Agreement--4,5.htm?brand=pcp&fs=1&brand=pcp&lang=en&s=859896778690976881&os=859896778690976881&sr=379415&osr=379415&flag=0000&l=&ic=0&st=0&bc=123&anid=0&se=611860&osadcampaign=

Paget, H. (2008, February 12). Telcos in massive SMS rip-off. NineMSN. Retirved June 27, 2008 from http://news.ninemsn.com.au/article.aspx?id=378291

PokerStars Online Poker Software Terms of Service. End user license agreement. (2009). Section 11. Disputes. Retrieved April 1, 2009 from http://www.pokerstars.com/poker/room/tos/

Prendergast, A. (2008, February 5): Phil Van Cise: Scourge of Denver's underworld. Denver Westworld News. Retrieved 7 November, 2008 from http://www.westword.com/2008-02-07/news/phil-van-cise-sourge-of-denver-s-underworld/1

Reagan, R. (2003). *Reagan: A life in letters*. New York NY: Free press.

Rey, C., & Dugelay, J-L. (2002). A survey of watermarking algorithms for image authentication. *EURASIP Journal on Applied Signal Processing, 6*, 613–621.

Sévigny, S.M., Cloutier, P.M., & Ladouceur, R. (2005). Internet gambling: misleading payout rates during the "Demo" period', *Computers in Human Behavior, 21*, 153–8.

Sinclair, L. (2008, December 4). Pizza, 'catch-up TV' on Tivo. *The Australian (IT Section).* Retrieved 12 January 2009 from http://www.australianit.news.com.au/story/0,,24749276-15306,00.html

Taylor, R.J. (2003). *Casino crimes and scams*. New York: Vantage Press.

Trappey, R.J., & Woodside, A.G. (2005). Consumer responses to interactive advertising campaigns coupling SMS direct marketing and TV commercials. *Journal of Advertsing Research, 45*(4), 382-401.

Terms and conditions of use of www.32vegas.com ("the Website"). (2009). Retrieved April 1, 2009 from http://www.32vegas.com/uk/terms-conditions.php

Toneguzzo, S. (1996a). Internet gaming, the next 5 years - can we control it. In B. Tolchard (Ed.), *Towards 2000: The future of gambling* (pp. 311-320). Proceedings of the 7th National Conference of the National Association for Gambling Studies, Adelaide, 18-21 November, 1996.

TSP Determination No.1. (2005). Telecommunications Service Provider (Mobile Premium Services) Determination No.1. Scheme approved by Australian Communications and Media Authority on 28 September 2006.

Twoway Interactive Entertainment , Gambling, para. 2. Retrieved 16 January 2009 from http://www.twowaytv.com.au/wagering_gambling/gambling.html

Van Cise, P.S. (1936). *Fighting the underworld*. London: Eyre & Spottiswoode.

Webber, J. (1999). *The ethics/skill interface in image manipulation*. In J. Scott, & B. Dalgarno (eds.), Proceedings of OZCHI'99 (pp. 85-91). Wagga Wagga: Charles Sturt University.

What is interactive TV? (2009). Retrieved 16 January 2009 from 1 http://www.tech-faq.com/interactive-tv.shtml

Wood, R.T., & Williams, R.J. (2007). Problem gambling on the Internet: Implications for Internet gambling policy in North America. *New Media & Society, 9*(3), 520-542.

Wood, R.T., Williams, R.J. & Lawton, P.K (2007). Why do Internet gamblers prefer online versus land-based venues? Some preliminary findings and implications. *Journal of Gambling Issues. Issue 20*, June. Retrieved 7 November, 2008 from http://www.camh.net/egambling/issue20/pdfs/07wood.pdf

Yahoo Press Release (2003, January 7). Retrieved August 14, 2008 from http://au.docs.yahoo.com/info/pr/2002/sms20020107.html

5. Resolution

After the consumer of online gaming has been informed of the outcome, the consumer either loses the initial stake, or is returned the initial stake and gains some additional amount. This involves the transfer of money electronically. Hence this section will address factors influencing the transfer of money. With a face-to-face transaction any money transferred can be monitored passing from person A to B, but this is not the case for an electronic funds transfer. An electronic transfer requires some degree of trust that an intermediary will behave in an agreed upon manner. Therefore this section will also address issues associated with the honesty and fidelity of an intermediary, and factors associated with the willingness to engage in and continue transactions.

5.1 Electronic trust

Computers and the so called computer revolution have changed many characteristics of workplaces (Parasuraman, 1997) and the field of governance is no exception. In addition to computers, the internet is one tool that has the potential to change government in the 21st century. One way this can be accomplished is though the movement of government-citizen interaction from the office 'bureaucratic' level to the provision of information and services on-line and the ability of people to interact with the government online via e-democracy (Reddick, 2005). Efforts have been made to sell the concept of e-government and its potential benefits to citizens, however there seems to be confusion as to what e-government actually is and what it can offer people (Toregas, 2001). Singh and Sahu (2007) have defined e-government as "the use of information and communications technology to improve the efficiency, effectiveness, transparency and accountability of government". Other authors have defined e-government based on what it can achieve (Bertot et al., 2006). For example Akman et al. (2005) defined e-government as the use of the internet or other technology to deliver services to people and businesses. E-government results in operational benefits which may include: continuous service availability; reduced response time; decreased errors; and increased efficiency (Akman et al., 2005). The promise of e-government is purported to also contain benefits for people including greater access to information, easier access to government forms, services and public policy information; the ability to pay fines or levies; making submissions to local members of parliament; renewing services (Akman et al., 2005). Further benefits of such services include: 24/7 access to government information; recording and storing information easily; the ability to conduct statistically valid online polls; the ability to have people e-vote on issues and conduct public meetings virtually (Toregas, 2001).

Despite this, the potential that e-government offers is much greater than simple service delivery. While the service components (paying fines etc.) are currently well defined and have been implemented in many jurisdictions, there are also democractic aspects (interaction with others on civic issues) that are part of e-government but are harder to define and set up (Toregas, 2001). Toregas (2001) argued that the first step in creating the more democratic aspects of e-government would be the creation of pathways allowing one to one, one to many and many to many interaction. Such pathways would allow citizens to interact with each other, and with government.

One important issue that has surfaced in the literature on the uptake and use of e-government services is the issue of trust. For example, in an survey done with an Australian sample in 2003-2004, it was found that high levels of trust were associated with higher

comfort with new technology, with communications technology (mobile phones and internet) scoring greater than 7 on a 10 point-Likert scale of comfort; 0 = not at all comfortable and 10 = very comfortable (Farquharson & Critchley, 2004).

Welch et al. (2005) considered the relationships between internet usage, citizen satisfaction with e-government and trust in government. The data analysed within this article was archival and came from previously collected telephone survey data collected in 2001. It was found that those people who used government web-sites were generally satisfied with e-government, and that there was a positive relationship between e-government satisfaction and trust in government. Welch et al. (2005) also found that while people were satisfied with the information dissemination of governments through electronic media, they were less satisfied with the transactional components of those sites. Despite this, there were a number of limitations with the study. First, the archival data was collected in 2001 and many changes have taken place on the internet with regards to citizen use and services available since then. In additions there have been changes in the accessibility of high speed broadband connections. Welch et al. (2005) also found that defining citizen trust in government is difficult because it may vary not only as a function of what information is available online but also to the person's interpretation of previous governmental performance. Hence a person who is frustrated with the government is likely to express low confidence in government services (whether they are offered online or not) and vice versa.

Trust is a subjective concept. Wang and Emurian (2005) discussed differences in the definition of trust amongst disciplines, and tried to apply a concept of trust to an online environment, specifically by looking at how purchases are made on the internet and how web/interface design features can increase trust in a web-site. Wang and Emurian (2005) noted that previous national surveys (such as the PIP Project in the US) have found that 68% of people express concern about revealing their credit card or personal details over the internet and that while 48% of people had made an internet purchase, 3% have reported being cheated or had their credit details stolen (Fox, 2000). In addition, in March, 2000 other research has found that of those internet users who had not made purchases on the internet, 94% were very or somewhat concerned that companies online may use their personal information for other purposes (BusinessWeek, 2000) and in another study conducted in September 2000 it was found that 8% of former users had left the internet due to privacy concerns and another 54% believed the internet was dangerous (Lenhardt, 2000).

Wang and Emurian (2005) believed that there are multiple characteristics of online trust including developing a relationship of trust between the trustor (consumer) and trustee (merchant, e-commerce web-site). They also noted that the relevant technology such as the internet may also be the object of trust or mis-trust. Vulnerability is also important because when making a purchase a trustor must believe that their details will not be misused or stolen. Ang et al. (2001) define 3 dimensions of trust that are important in an online environment:
1. Service performs as promised.
2. Merchant should be willing to rectify a problem if one is encountered or if the product does not meet the customer's satisfaction.
3. Privacy policy should be displayed on the web-site.

In a study exploring issues related to online trust, Ba and Pavlou (2002) studied 393 experienced e-bay buyers and found that buyer's reports of a seller's credibility were important. Ba and Pavlou (2002) manipulated positive and negative feedback about the seller and then asked participants to rate the seller's credibility. Better feedback profiles induced

higher levels of trust. More positive feedback ratings were associated with greater trust. However negative ratings had a stronger impact upon trust than positive ratings. In particular, higher levels of trust can be associated with a willingness to pay more (particularly for expensive products). This study was of interest because the previously discussed definitions of trust within this review often represent a researcher's views, or the concerns of e-consumers, but this study supplied some empirical data related to the purchasing actions of consumers (Ba & Pavlou, 2002).

There is some resistance in internet users to making business purchases over the internet because of privacy and trust concerns. Akman et al. (2005) looked at archival data on how individual beliefs about the privacy and trustworthiness of the internet and their attitudes towards the internet affected individual intentions and actual purchasing using the theory of planned behaviour (Ajzen, 1991) where a person's intention to perform a given behaviour is influenced by attitude toward a target behaviour and the norms about engaging in that behaviour and also perceived behavioural control. This model has been used in information system studies on user acceptance.

George et al. (2002) found that more internet experience was associated with more positive views on the trustworthiness of the internet (r=.298) and that increased trustworthiness was associated with more positive attitude to making internet purchases (r=.347). Intent to purchase was associated with purchasing (r=.394) and there was a relationship between internet experience and internet purchasing (r=.286). The authors suggested that as novice internet users gain more experience they will make their first purchase, and then purchase more often, but those who like to have a strong control over privacy of information will view it more negatively. Thus, retailers may attract more people to making on-line purchases by addressing privacy issues. One limitation again with this study was use of archival data that was collected for other purposes and did not test other components of the Theory of Planned Behaviour such as subjective norms and perceived behavioural control that may also play a role in trust and whether or not people will make an online purchase.

Some research that has considered trust has identified several issues that appear to be central to the concept of trust including: security, reliability, identity, authentication, confidentiality and verification (Welch, 2005). Wang et al. (1998) constructed a table showing that trust in internet marketing may be best thought of as a taxonomy and relates to multiple steps along the transactional process (see Table 5.1).

Table 5.1. A taxonomy of privacy concerns (from Wang et al. 1998).

	Improper acquisition			Improper use		Privacy invasion	Improper storage
	Improper access	Improper collection	Improper monitoring	Improper analysis	Improper transfer	Unwanted solicitation	
Direct mailing				P		E	
Preference tracking	E	E	E				
Unwanted eavesdrop	P	E	E				
No opting-out				E			P
Third-party distribution				E	E		P

E: Explicit   P: Probable

According to Wang et al's (1998) table:

> **Improper access** – the ability to infiltrate a person's private computer without their knowledge.
> **Improper collection** – Collecting information about a person (e-mail address, web access history, software used, private files) without their consent.
> **Improper monitoring**- Monitoring a person's internet activities e.g. cookies to determine what sites were visited and for how long.
> **Improper analysis** – Analysing a person's private information without their consent (e.g. by looking at shopping and spending patterns).
> **Improper transfer** – Transferring private details to another source or business without a person's consent.
> **Unwanted solicitation** – Transmission of information to potential customers without their permission (e.g. SPAM, mass direct mail).
> **Improper storage** – Keeping private information in a non-secure manner that may compromise data confidentiality and be available to be used by a 3rd party.

Hence a person's trust in the internet, in on-line services and in e-government is likely to be intertwined. Table 5.1 demonstrates that there are many points where a person is interacting on-line that their trust may be violated and hence the concern with participating in and/or using e-government services. According to Horst et al. (2007), the use of these services by the public may be thought of as a benefit versus risk analysis. People must decide whether the perceived usefulness of having these services online outweighs the risks to their personal information which is sent and stored electronically. The risk of this is that 3rd parties could intercept and misuse or modify any information that is sent, and the information could be passed onto other organisations without the consent of the individual. This has been alleged to occur in Indian call centres (see http://www.abc.net.au/news/newsitems/200508/s1437366.htm), and appears to be a service that they actually offer (see http://www.indiancallcenterz.com/outbound_service.php).

Advances in technology and the ability of people to use different technologies to interact remotely with an event has led not only to advances in e-governance but also advances in other forms of previously social interactions including entertainment and shopping. Buying merchandise via the internet, auction sites such as e-bay or even through a TV are some recent examples. As new technologies and capabilities emerge they can get ahead of legislation, a situation confronted by the British Government in relation to "participation TV" (Ofcom, 2006). Participation TV refers to services that rely on viewer's paying for an opportunity to participate in the service. For example, viewers are subjected to repeated messages both verbal and in on-screen graphics to call a premium rate number and participate. This content may take a number of forms, including quiz services, adult chat, psychic readings and dating (Ofcom, 2006). One concern with participation TV relates to trust and reliability of the service. For example, "Viewers are often repeatedly encouraged to spend money to interact with the service; however, they may not always fully understand the charges involved or indeed what they are getting in return" (Ofcom, 2006).

Reddick (2005) noted that early research on e-government has mainly considered the supply of services on-line, but not the demand for the service. Reddick (2005) argued that the progression of service from offline to online transactions takes place in steps: first the government has to have an on-line presence and provide information about the services they offer (i.e. information dissemination) (Welch et al., 2005). Initially the majority of e-government has been one way communication to the public, rather than a two way communication that allows for engagement with people in discussions, debates or decision making online (but see Shulman, 2009).

Reddick (2005) used archival information from the Pew Internet and American Life Project (which was a telephone survey). For their analysis, a sample of 815 was used, but a high refusal rate 51% was noted. The study sought to explain citizen interaction with e-government with variables from three domains: *social-demographic* (white, male, college education, high income were hypothesised to result in more interaction); *e-democracy* (republicans were hypothesised to trust government more, and therefore be more likely to use services); *citizen interaction* (those who are able to get the information they want will use the service more, those who use the internet more will use more services). Reddick (2005) found that 23% of the sample used the internet to look for information on government web sites several times per month, and that another 22% did so every two months. The proportions of people using the internet that found what they wanted *all of the time* was 14% of the sample, and *most of the time* was 44% of the sample. And 60% could do what they wanted to do on the internet relating to e-government. When looking at what interaction people were having with e-government web-sites, the majority of interactions were informational (tourism, recreational information 77.3%) (research for work or school 69.8%). The most common transactional interactions were (filing tax return 15.7%; renewing a driver licence or car registration 11.5%), whereas paying a fine was done by only 1.7% (Reddick, 2005). Next, Reddick (2005) considered what factors were related to engagement in e-government usage. They found support for an age effect with people aged 55-64 being less likely to use the services, and that a person's trust in government and wanting to change public policy were also significantly related to use of services. The limitations of this study were that internet users were targeted (rather than general population sample being used, potentially decreasing generalisability) and the number of people using the services were still modest.

Other governments around the world have also taken up e-government services. For example, the Dutch government has digitised much of its public service and also uses the

Internet to communicate with people (Horst et al., 2007; Van Dijk et al., 2008). Horst et al. (2007) considered a convenience sample of 238 people and their intention to adopt the government's e-services. It was found that the strongest correlation with intention to adopt was the perceived usefulness of the e-service (r=.51) and perceived usefulness of the e-government services (r=.22). Risk (r=-.26) personal experience, perceived control and behavioural norms were also related to the intent to use, again stressing a role for trust in an on-line environment.

Van Dijk et al. (2008) reported on data from the 2006 national Dutch survey, where 1225 respondents answered questions relating to their acceptance of technology online. The survey distinguished between the actual use and people's intended use of government services via the internet and also considered results from the whole population of users, and an internet population in order to give some indication of future markets for such use. Across the levels of government in the Netherlands (municipal, national) the intended use was much higher than the actual use. Between 60-85% of non-users said they would use a service if it were offered and when they needed it, indicating the potential for a large growth market. Next the authors considered what factors explain actual and intended use of internet services. For this they used a modified version of the Unified Theory of Acceptance and Use of Technology Model (Venkatesh et al., 2003) which contained a multidisciplinary set of factors (sociodemographic, media use, supply of services) and looked at the relationship to both intention to use and actual use. A high correlation between intention to use and actual use (r = .542) was found, indicating that there is a growth market. Intended use was negatively correlated with age (r = -.375). Intended use was positively correlated with access to digital media (r=.431) and also with experience with digital media (r = .478). The authors then used Structural Equation Modelling to explain both intention to use and actual use of services. They found that the best factors were service supply, knowledge of services and digital media use. This is possibly surprising since the psychological literature emphasises the importance for technology acceptance of sociodemographical variables such as age, and education (see Reddick, 2005). Therefore use or uptake of these services may involve a learning component, and may be best studied over time in a longitudinal research design. People will stick to using more traditional forms of media (e.g. phones; call centres) until they learn a better alternative.

Other studies on e-government also have been conducted. For example, developing countries are interested in e-government because they perceive that otherwise they will fall further behind the rest of the world in technology. Paul (2007) looked at the performance of different e-government initiatives in Delhi, India. They found that since the introduction of e-services, that the registration of a new co-op society - an application that used to take 15-20 days to process - now took only 5-7 after the service was available online, and the number of visits to government offices for this service was almost zero. In another area, that of computerised driving licences, there was a reduction in processing time from 3 to 0.5 days. An implementation of e-government services is occurring in other countries and can confer benefits in terms of greater efficiency and reduced transaction times.

Streib and Navarro (2005) considered whether or not there is a demand for e-government. The data for this study came from a telephone poll in Georgia, USA and the ways in which people communicate with the Office of Consumer Affairs, and how effective those methods were. They noted that while internet access is one issue which is normally regarded as a limiter to uptake of e-government, that other things may be relevant including who wants to use the services. They asked respondents (*n*=1550) to rate different forms of interaction based on their effectiveness in dealing with the government and found that "in

person" interactions received the highest rating (between 30-35% of people rated as "very effective") but that web-forums and e-mail were only rated as "very effective" by 20% of people. From the paper, it is unclear whether they did statistical analysis on these numbers to look at significant differences amongst the categories. Next, the authors looked at particular on-line methods of communication and how effective they were rated. 60.8 % rated that web forums, e-mail and forums on the web were effective in delivering their relevant services, 14.6% said none of these web-based methods were, and the majority of people (close to 50%) preferred interacting with government in person or via telephone. Unfortunately it was unclear as to the reasons why this was the case as further analysis was not conducted.

The most commonly cited barrier to e-government is lack of internet service to certain groups and often these are low income or vulnerable groups who actually do need particular services or information or who benefit the most if they did have access to those services (Akman et al., 2005). More specifically, for people to access e-government services, they need to own a computer and know how to use it, be able to navigate screens and execute commands (Toregas, 2001). The W3C has set forth guidelines to reduce some of these issues, but it is still an area of concern.

In exploring why people may not take up e-government services, Bertot et al. (2006) found that government agencies did not regularly engage citizens in the development of their e-government services, nor did they use citizen feedback on these services, they did not evaluate service quality, outcomes or engage in other evaluations once a service was up and running. The most common reason for this was to cut costs. However, when Bertot et al. (2006) asked citizen users of these e-government services as to why they did not use e-government, they identified a lack of integration across different services, making them harder to use, especially for those with poorer computer skills. Technology issues were also important in this study as some users had limited accessibility because particular services required the use of a particular browser or software component. These issues relate to the idea of online trust. If citizens are not involved in the development of e-government services and not given a place to provide feedback it is likely that they will not trust the service and will not use it. There is some evidence to support this. For instance Phillips, Jory and Mogford (2007) reported decreased satisfaction in people who avoided using electronic educational resources. Governments implementing such systems should try to build trust by engaging citizens at these levels of development and feedback in order to promote use. Conversely, Phillips, Jory and Mogford (2007) suggested that citizens should be informed before they can register their preferences - a form of electronic citizenship for their electronic franchise.

As indicated in the previous paragraph, there may need to be some participation in the development of e-government for it to be taken up by the community. Nevertheless electronic participation can be abused. Although western democracies are based upon one person, one vote, it is sometimes the case that people vote frequently and often. It is possible for multiple complaints to be logged to make an issue appear more important that it actually is (Shulman, 2009). Obtaining a bogus ID on-line is relatively easy and then for example a person may overwhelm public officials on an issue when the same complaint is coming from a single person multiple times (Toregas, 2001). The ability to easily obtain a bogus ID only decreases online trust.

It has been hoped that computers will be able to modernise the voting process. The potential advantages of e-voting include: faster result tabulation; elimination of human error; assistance to voters with special needs; and defence against fraud that have been associated

with certain types of voting (e.g. postals) (Cansell et al., 2007). Nevertheless, using computers to register electronic preferences also brings a new set of problems including secrecy, accuracy and security concerns (Gibson et al., 2008; McGaley & Gibson, 2008). In addition to the usability of such systems, the potential for verification and validation has important ramifications for the uptake by participants and whether they will be used and trusted (McGaley & Gibson, 2008). When e-voting occurs, the possibility of fraud is unavoidable because at every step in the process results can be manipulated if there is a lack of validation or verification (Cetinkaya & Cetinkaya, 2007). This differs from 'offline' traditional voting because all of the collecting, counting and scrutinising is done in front of observers that include representatives from political parties, observers who are neutral, and non-government related sources including media representatives (Cetinkaya & Cetinkaya, 2007).

There are a variety of ways in which people's electronic preferences could be tampered with. For example Cetinkaya and Cetinkaya (2007) stated that a malicious authority could add votes for those who abstain from voting, or add ineligible names to the list of registered voters.   Indeed it has been suggested that malicious code could be included within e-voting parameters, resulting in the incorrect counting of votes, while maintaining the appearance to individual voters that their vote was successfully recorded for the candidate they wished to vote for (Clark, 2005; Stone, 2003). For example, the news agency CNN ran a story on how e-voting machines may be hacked, resulting in the incorrect counting of votes (video available at: http://www.youtube.com/watch?v=5hCyVsUir8k, last accessed 4th June, 2009).

Other problems that have been identified with e-voting systems include voters not correctly completing their votes, by leaving a polling station when the summary screen is displayed, without confirming the validity and accuracy of their vote (Everett, PhD dissertation, May 2007) or the summary screen not being checked at all by participants. In one study, vote 'flipping' occurred at the 'review' stage screen after participants (n = 108) had voted for a candidate (Everett, 2007). In this study a number of changes were made to a person's vote (1, 2 or 8). The study also varied the location of the changes made (either at the top or the bottom of the ballot) and the type of change made (change of vote to either a different candidate or to "no candidate" at all). *Only 37% of participants detected the change to their vote*, despite the fact that all participants' reported that the review screen was useful *and 95% of participants said they checked their ballot 'carefully' or 'somewhat carefully'.* Interestingly, 70% of participants felt that *the review screen made them confident that their vote would be counted correctly.* Despite these findings that changes could be made to a person's vote without them detecting it, this study was limited as it contained multiple independent variables with multiple levels, and not enough participants to enable examination of higher order interactions. Other media outlets have also reported that errors in the e-voting process may be included into the system by: votes being wrongly disallowed; people voting for more than the allowable number of candidates (http://www.verifiedvoting.org/article.php?id=5185); or by e-voting machines recording incorrect votes on touch screen because of participants resting their thumb or hand on another part of the screen and recording a vote for another non-desired candidate (http://sanantonio.bizjournals.com/sanantonio/stories/2004/10/18/daily37.html).

In other words, in an electronic environment people's preferences can be registered, but that does not mean that the preferences are registered faithfully. And even if feedback is supplied, there is no guarantee that participants will notice some of the changes to their

preferences. Similar issues occur within gaming environments. People normally focus their attention on specific sections of a virtual environment, and pay less attention to the remainder. This means that they may not detect manipulations to other parts of the computer screen. In a series of studies Chow, Pose, Regan, and Phillips (2005; 2006a, b) sought techniques for differentially manipulating different parts of the visual display (foreground and background) in computer game environments. Participants were presented with two scenes, and asked to detect distortions. Distortions were more readily detected on a computer monitor than on helmet mounted displays. The issue seems to be related to field of view, as problems observed with helmet mounted displays could be obviated by a wider field of view on a helmet mounted display. People who played computer games more often were more likely to detect distortion/manipulation. Differences in selective attention capabilities in game players have been noticed elsewhere (Green & Bavelier, 2003). The implications being that the majority of people may not notice a lack of fidelity in their gaming experience, and that this could be more of a concern on smaller screens (e.g. mobile phones), but that regular gamers may detect such changes, and that this may influence their subsequent trust in the interaction.

This relationship between reliability and trust extends to other areas where automation has occurred (Lee & See, 2004; Parasuraman, 1997). For example, people who find automatic braking systems reliable when driving on ice are more likely to use them; and people who experience a high number of 'false alarms' with their smoke detectors are more likely to disable them (Parasuraman, 1997). Therefore, in order for people to use e-government and e-voting, they first must trust that these systems are reliable. In a study looking at the relationship between trust in an automated factory system, and self-confidence in a person's own manual control capabilities, Lee and Moray (1994) found that the two concepts of trust and self-confidence explained the person's strategy in controlling the factory. It was found that automation was used when trust was greater than self confidence, and manual control was used in the opposing instance, namely when self confidence was greater than trust in the automated system.

While the internet contains a lot of information useful in terms of services, it also requires skills to search through that information to find what is needed (Singh & Sahu, 2007). The same information can be more easily obtained by ringing someone with that expertise. For example, Singh and Sahu (2007) contrasted searching for the cheapest plane flight online with the time spent calling a travel agent, and found that the cheapest flight was obtained much faster and more efficiently via the telephone. Language is also a barrier to internet use; 90% of websites are in English, but 75% of the world's population does not understand English and therefore e-government websites should be in languages relevant to the country where services are offered (Singh & Sahu, 2007). This creates problems for example in India where there are 18 languages recognised by the constitution. Singh and Sahu (2007) argued that mobile government should supplement internet based services because more people have access to mobile phones and many of the services can be delivered via this media. M-government has already been used in multiple jurisdictions. For example: in the UK; SMS voting has occurred in local council matters; in Ireland people are able to pay for parking via mobile phone and; in India there is an SMS service for cargo/parcel tracking (Singh & Sahu, 2007). Mobiles can provide many of the services of the internet (see Table 5.2), as they can access the internet and therefore their use in supplementation to e-government would increase uptake because each provides solutions to many more people. However one limitation is that mobile phones and networks potentially differ in their capability to offer and support these services.

Table 5.2. Comparison of the features of personal computer and mobile phones (from Singh & Sahu, 2007).

Comparison of the features of personal computer and mobile phones

Features	PC (with Internet)	Mobile phone
General		
Cost	High	Low
Memory	High	Low
Processing speed	High	Low
Screen size	Large	Small
Portability	Low	High
Pocket ability	No	Yes
Weight	High (in Kgs.)	Low (in Grams)
Value added services	Low	High
Language of communication	English	Any Language
Need for training and expertise	High	Very Low
Quality of telephony	Poor (via VoIP)	Good
Infrastructure requirements		
Constant electric power required	Yes	No
Internet service provider required	Yes	No
Telephone/broadband connection required	Yes	No
Data transmission		
Method	E-mail	SMS
Document transmission	Possible	Not possible
Size of data	Very Large	Small
Time spent in typing of message	Low	Medium
Time to access information from dispatch	On opening the e-mail account	Immediate
Cost of sending one information (in India)	US$ 0.05 per call	US$ 0.01 per message
Accessing information		
Internet connectivity	Possible on all PCs with modem	Possible only in few models
Size of Web page which can be down loaded	High	Low
Utility/menu accessible	High	Low
Financial transactions	Yes	Yes
Authorizing transaction	Yes	Yes

Therefore the future of e-government may involve greater use of the mobile phone in order to increase access and provide a greater level of service accessibility. In addition to this, a greater access to *transactional* services rather than just *informational* ones will become increasingly more available through e-government (Akman et al., 2005). Further steps in transactional services may include **vertical integration** - linking local and national databases that share common information sources to reduce redundancies or inconsistencies about people or businesses, and then **horizontal integration** - where transaction in one agency leads to checks against data in other agencies (Akman et al., 2005). One of the promises of e-services (including e-democracy and e-government) is to engage people in a user-centric manner and to offer services that are efficient and effective (Bertot et al., 2006). The idea of user-centred systems suggests that these services will be tailored to individual needs, and to the actual services and resources desired by a person or company.

5.1.1 Electronic trust - limitations and conclusions

There has been an increased interest in e-government and the number of research articles appearing in journals at conferences has been increasing as noted in a review by Heeks and Bailur (2007). They note that the relevant article authors have come from diverse fields including governance (public administration, political science) and "informatics" (library, information systems, computer science). In their paper, Heeks and Bailur (2007) reviewed the philosophies, theories, methods, and practice of 84 papers from journals and conferences on e-government. The study found that despite the increase in the number of articles appearing recently in the area, that many were subject to major flaws including a poor use of research methods, scientific rigor, over generalisations of research findings and a lack of adequate literature reviews. There were serious problems within this field. For example, Table 5.3 from Heeks and Bailur (2007) below shows that a high proportion of paper used either no literature (8/84) or only one to two sources (13/84).

Table 5.3. Main literature used by e-government researchers (From Heeks & Bailur, 2007).

Main literature used by e-government researchers

Literature used	Frequency
E-government	33
Information systems (including e-business)	19
Public administration	9
Management	8
Political science	5
Computer science	5
Other	2
Just one/two items used	13
No literature used	8

In addition to this, of the articles analysed, 3/5 made no statement as to how data was collected, and while in some cases methodology was implied it was impossible for the authors to gauge how the data had been produced (see Table 5.4 from Heeks & Bailur, 2007).

Table 5.4. Research methods in use by e-government researchers (From Heeks & Bailur, 2007).

Research methods in use by e-government researchers

Research method	Frequency
No discernible method	20
Hunt and peck	19
Questionnaire	15
Document analysis	14
Interview	14
Web content evaluation	7
Literature review	6
Reflection on project experience	6
Observation	3
Other	7

Furthermore, regarding practical recommendations for e-government in these papers, Heeks and Bailur (2007) found that less than half (40.84%) had specific practical recommendations, ¾ of these recommendations were either single sentences up to one paragraph, and only 4 papers in total gave guidance on how practitioners or policy makers

should take action. Heeks and Bailur (2007) argued that the research on e-government falls in between theory and practice. It does not add to the body of theory, nor does it give any practical recommendations. Much future research using sound methodology and more rigorous research designs is needed to provide information on the use, potential use, barriers and future development of e-government. The field of e-government may be informed by the research on trust that has gone on in the fields of automation in aircraft and factory control (Parasuraman, 1997).

Online trust is an area where more research is required. Online interactions with organisations can potentially speed up transactions, but a variety of factors such as experience and trust can influence their use. The following section specifically addresses issues associated with financial transactions and gambling.

5.2 Ecash

The *Interactive Gambling Act 2001* makes it an offence to provide interactive gambling services such as roulette, poker, craps and online poker machines to customers physically located in Australia. The offence applies to all interactive gambling service providers regardless of ownership (i.e. Australian or foreign owned) or location (i.e. based in Australia or offshore). The Act also makes it an offence to advertise interactive gambling services in Australia (Dept. of Communications, Information Technology and the Arts, 2004) although there are some exceptions (http://www.acma.gov.au/web/standard/pc=PC_90135).

Despite the provisions of the act, off-shore interactive gambling *is* advertised in Australia (see for example; http://online.casinocity.com/) and while it may be an offence to offer such services, it is not an offence to utilise them with the result Australians are claimed to spend more than an estimated $300 million annually on online poker (Betfair Australasia, 2009).

Most online gambling sites require users to first deposit money into a betting account before they can commence gambling. Money can be transferred to the betting account from, for example, an existing bank account or debited directly to a credit card such as those supplied by Visa or Mastercard. In order to function then, interactive gambling requires the ability to transfer money electronically. That is, it requires the use of electronic cash (*e*-cash) and that presents potential problems.

A recent article from the International Centre for Youth Gambling Problems and High Risk Behaviors claimed that "a protective factor" preventing some adolescents from engaging in online gambling was their lack of access to a credit card. The article expressed concern that new products from Visa and Mastercard would soon remove that barrier as those providers had begun to offer prepaid debit cards. As the cards purportedly required no application process the potential existed for minors to purchase the cards and use them to undertake online gambling (Gupta, 2009):

One such card available in the US is the PrivaCash Prepaid Mastercard Card with features including:
"…Instant Plastic, No Application, No Age Limit, No Credit Check, No statement. Load $25-$500 and leave with the plastic card you can use at 28 million locations on or off line".

http://www.mastercard.com/us/personal/en/findacard/prepaidcard_search.html
Accessed 1/5/09

The card also purports anonymity in that it is not linked to personal credit information and has no identifying information (such as name or signature) stored on the card itself.

Despite the "no application" claim, on-line purchasers of the card are required to provide their name, address, date of birth, social security number, telephone number and credit card details in addition to other optional information such as email address (https://secure.privacash.com/index.cfm?catID=upgrade2 Accessed 7/5/09). In its FAQ's PrivaCash attributes the need for such information to a combination of "security reasons" and requirements of the US Governments *Patriot Act*. The relevant sections of that Act are aimed at minimising money laundering and so require financial institutions such as banks and credit unions to obtain identifying information from new account customers. The Act specifies the minimum identifying information to be name, address, government issued identification number (such as social security number) and date of birth (http://www.occ.treas.gov/ftp/bulletin/2003-22.doc Accessed 7/5/09).

While face-to-face purchases only require the card holder to provide a security code number, the expiration date of the card and the card itself, online purchases also require a shipping address. To minimise the likelihood of some internet retailers declining a sale because the billing and shipping address differ, PrivaCash advises online purchasers to use the name and address provided when the card was originally purchased/activated as the shipping address. For internet transactions then, an attempt is made to link the card purchaser to the card user.

The PrivaCash database purportedly tracks every transaction in real time (http://findarticles.com/p/articles/mi_hb4838/is_1_35/ai_n28975841/) thereby allowing PrivaCash to monitor card usage for any "Prohibited Activity". Such activity includes "unlawful gambling" (PrivaCash claim their cards are "restricted at online gambling sites") with users suspected of engaging in such activities subject to suspension from the program and/or cancellation of their card.

The combination of establishing the identity of the card purchaser, attempting to link on-line activities to the purchaser and real time transaction tracking make it unlikely debit card purchasers could successfully use those cards to aid on-line gambling.

Although the identity of the card purchaser is known to PrivaCash, the card can be gifted to another person whose identity is unknown and who could be a minor. In such cases the under-age card user could anonymously attempt prohibited on-line activities, however real time transaction tracking would eventually result in the (known) card purchaser being alerted to those illicit activities. The purchaser may then act to end those activities in an effort to avoid card cancellation and/or a black mark on their credit history.

In the US then it seems possible that underage recipients of prepaid debit cards may attempt online gambling anonymously for a period of time. However their identity and any attempted gambling would eventually come to the attention of the card purchaser.

The situation appears similar in Australia where Visa, Mastercard as well as numerous banks offer prepaid debit cards (http://www.creditmart.com.au/st_144_Debit-

Cards.htm?gclid=CNb7gdaYvZoCFZUvpAodpyXKqw). The Terms and Conditions associated with the cards prohibit their use for "unlawful purpose" and all internet transactions are monitored. The ANZ Bank for example, states in its Privacy and Security statement that it uses cookies as "…a fundamental part of our interaction with your Internet browser" to obtain information including "… to identify pages you have accessed and Third Party websites you have accessed" (https://www.anz.com/australia/support/general/Privacystatement.asp).

The Australian Federal Government requires, through the *Financial Transaction Reports Act 1988*, that financial institutions establish the identify of new account holders (http://www.caslon.com.au/100pointsnote.htm) and so all would-be applicants for such cards are required to prove they are over 18 years, restricting the purchase of such cards to adults. Once again, the cards can be gifted to minors but eventual detection of illicit activity by the card purchaser is likely.

Despite the various legislative Acts, the terms and conditions associated with the use of debit cards and the ability of financial institutions to monitor internet transactions, Australians continue to use online gambling sites. Clarke and Dempsey (2001) suggested that is attributable to a combination of factors including:
- The perception there is little risk of detection and prosecution;
- Online gamblers are inherently risk takers and so are unlikely to be deterred by the illegal nature of such activities;
- The perception that law enforcement agencies are both under-educated in computer technology and more likely to assign resources to "real world" crimes such as murder or more serious internet concerns such as child pornography;
- The inability to enforce Australian legislation in international jurisdictions.

5.3 Summary
The willingness to engage in electronic transactions is a function of experience and trust in the organisation or the technology. Although prepaid debit cards may offer a mechanism to confuse the audit trail or allow under-age gambling, there are potentially constraints upon the misuse of these cards.

5.4 References
Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Akman, I, Yazici, A., Mishra, A, (2005). E-government: A global view and an empirical evaluation of some attributes of citizens. *Government Information Quarterly, 22*(2), 239-257.

Ang, L., Dubelaar, C., & Lee, B.C. (2001). To trust or not to trust? A model of internet trust from the customers point of view. *Proceedings of the 14th Bled Electronic Commerce Conference,* Bled, Slovenia, pp. 40-52.

Ba, S., & Pavlou, P.A. (2002). Evidence of the effect of trust building technology in electronic markets: Price premiums and buyer behavior. *MIS Quarterly, 26*(3), 243-268.

Betfair Australasia (2009). Submission to the Productivity Commission Enquiry into Gambling – 2009. Available at: http://www.pc.gov.au/__data/assets/pdf_file/0008/87776/sub181.pdf

Bertot, J.C., Jaeger, P.T., & McClure, C.R. (2006). Citizen-centered e-government services: benefits, costs, and research needs. *ACM International Conference Proceeding Series, 289*, 137-142.

BusinessWeek (2000). A growing threat. *BusinessWeek, 20th March,* pg. 96.

Cansell, D., Gibson, J.P., & Mery, D. (2007). Formal verification of tamper-evident storage for e-voting. 5th IEEEE International Conference on Software Engineering and Formal Methods.

Cetinkaya, O., & Cetinkaya, D. (2007). Verification and validation issues in electronic voting. *The Electronic Journal of e-Government, 5,* 117-126.

Chow, Y-W., Pose, R., Regan, M. & Phillips, J. (2005). *The effects of head-mounted display attributes on human visual perception of region warping distortions*. Proceedings of the Image and Vision Computing Conference, Dunedin, New Zealand. http://pixel.otago.ac.nz/ipapers/88.pdf

Chow, Y-W, Pose, R., Regan, M., & Phillips, J.G. (2006a). *Human visual perception of region warping distortions with different display and scene characteristics.* Proceedings of Graphite'06, 29th November 2006, Kuala Lumpur, Malaysia.

Chow, Y-W, Pose, R., Regan, M., & Phillips, J. (2006b). *Human visual perception of region warping distortions*. Proceedings of the 29th Australasian Computer Science Conference, Hobart, Tasmania. http://crpit.com/confpapers/CRPITV48Chow.pdf

Clark, K. (2005). *Can e-voting software be secured to ensure the accuracy of the election*. 21st Computer Science Seminar, Hartford, CT, USA, 12th April 2005.

Clarke, R. & Dempsey, G. (2001): The Feasibility of Regulating Gambling on the Internet. *Managerial and Decision Economics, 22*, 125-132

Dept of Communications, Information Technology and the Arts (2004). Review of the operation of the Interactive Gambling Act 2001. Available at: http://www.archive.dbcde.gov.au/__data/assets/pdf_file/0015/10950/Review_of_the_ Operation_of_the_Interactive_Gambling_Act_2001_Report.pdf

Everett, S.P. (2007). *The Usability of Electronic Voting Machines and How Votes Can Be Changed Without Detection*, PhD thesis, Rice University, May 2007.

Farquharson, K., & Critchley, C. (2004). Risk, trust and cutting edge technologies: A study of Australian attitudes. *Australian Journal of Emerging Technologies and Society, 2,* 124-146.

Fox, S. (2000). Trust and privacy online: Why Americans want to rewrite the rules. *The Pew Internet & American Life Project,* Washington DC. Accessed at: www.pewinternet.org, 24th Feb., 2009.

George, J.F. (2002). Influences on the intent to make internet purchases. *Internet Research: Electronic Networking Applications and Policy, 12,* 165-180.

Gibson, J.P., Lallet, E., & Raffy, J-L. (2008). Analysis of a distributed e-voting system architecture against quality of Service requirements . *3rd International Conference on Software Engineering Analysis.*

Green, C.S., & Bavelier, D. (2003). Action video game modifies visual selective attention. *Nature, 423,* 534-537.

Gupta, R. (2009): New prepaid credit cards remove barriers to youth online spending. *International Centre for Youth Gambling Problems and High Risk Behaviors. Spring, 9*(1). Available at: http://www.youthgambling.com/en/PDF/Newsletter/Spring2009.pdf

Heeks, R., & Bailur, S. (2007). Analyzing e-government research: Perspective, philosophies, theories, methods, and practice. *Government Information Quarterly, 24*(2), 243-265.

Horst, M., Kuttschreuter, M., & Gutteling, J.M. (2007). Perceived usefulness, personal experiences, risk perception and trust as determinants of adoption of e-government services in The Netherlands. *Computers in Human Behavior, 23,* 1838-1852.

Lee, J.D., & Moray, N. (1994). Trust, self-confidence, and operators' adaptation to automation. *International Journal of Human-Computer Studies, 40,* 153-184.

Lee, J.D., & See, K.A. (2004). Trust in automation: designing for appropriate reliance. *Human Factors, 46,* 50-80.

Lenhardt, A. (2000). Who's not online: 57 percent of those without internet access say they do not plan to log on. *Pew Internet and American Life Project.* Accessed at: www.pewinternet.org, 24th Feb., 2009.

McGaley, M., & Gibson, P. (2008). Verification and maintenance of e-voting systems and standards. *8th European conference of e-government.*

Ofcom. Participation TV: How should it be regulated ? Issues Paper published 15/12/06. Available at: http://www.ofcom.org.uk/consult/condocs/participation/

Parasuraman, R. (1997). Humans and automation: use, misuse, disuse, abuse. *Human Factors, 39,* 230-253.

Paul, S. (2007). A case study of E-governance initiatives in India. *The International Information & Library Review, 39*, 176-184.

Phillips, J.G., Jory, M., & Mogford, N. (2007). Decisional style and eParticipation. Proceedings of OZCHI2007, pp. 139-141. Available from http://portal.acm.org/dl.cfm.

Reddick, C.G. (2005). Citizen interaction with e-government: From the streets to servers? *Government Information quarterly, 22,* 38-57.

Shulman, S.W. (2009). The case against mass e-mails: Perverse incentives and low quality public participation in U.S. federal rulemaking. *Policy & Internet, 1*, 23-53.

Singh, A.K., & Sahu, R. (2007). Integrating internet, telephones, and call centers for delivering better quality e-government to all citizens. *Government Information Quarterly, 25,* 477-490.

Stone, A. (2003). E-voting: should we pull the lever? *IEEE Software, 20*(6), 12-14.

Streib, G., & Navarro, I. (2005). Citizen demand for interactive e-government. *American Review if Public Administration, 36,* 288-300.

Toregas, C. (2001). The politics of e-government: the upcoming struggle for redefining civic engagement. *National Civic Review, 90,* 235-240.

Van Dijk, J.A.G.M., Peters, O., & Ebbers, W. (2008). Explaining the acceptance and use of government internet services: A multivariate analysis of 2006 survey data in the Netherlands. *Government Information Quarterly, 25,* 379-399.

Venkatesh, V., Morris, M., & Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. *Management Information Quarterly, 27,* 425-478.

Wang, Y.D., & Emurian, H.H. (2005). An overview of online trust: concepts, elements and implications. *Computers in Human Behavior, 21,* 105-125.

Wang, H., Lee, M.K.O., & Wang, C. (1998). Consumer privacy concerns about internet marketing. *Communications of the ACM, 41,* 63-70.

Welch, E.W., Hinnant, C.C., & Moon, M.J. (2005). Linking citizen satisfaction with e-government and trust in government. *Journal of Public Administration Research and Theory, 15,* 371-391.

6. Dispute

After an outcome, the amounts hazarded by the consumer are adjusted by the provider of electronic gaming product. Potential for dispute arises when there is noncompliance with the social contract between the provider and consumer of gambling product (Henderson, 1985) (see Sections 4.5, 4.6). There are a number of factors that can contribute to dispute.

6.1 Technology and problem gambling

As discussed in Section 2, when considering online gambling, the ubiquitousness of computing devices could be grounds for concern. The potential availability of gambling online on web capable devices, mobile phones and televisions means that almost every person in Australia would have access to a gaming terminal in the guise of a mobile phone, with additional gaming terminals in the work place and in many rooms in the house. However the relationships between availability and problem gambling are complex (Abbott, 2006), and may reflect not just characteristics of the individual but also whether controls are available. In this regard unregulated online gambling is a potential concern because the appropriate controls to minimise harm may not be in place, or may be difficult to locate (Monaghan, 2009).

There has already been discussion as to whether technologies such as the internet are addictive (Griffiths, 1996; Shaffer, 1996). Indeed authors using symptoms such as tolerance, withdrawal and craving, have created reliable instruments (Armstrong, Phillips, & Saling, 2000; Bianchi & Phillips, 2006) that can predict greater use of these technologies.

Claims that a behaviour such as mobile phone use can be addictive can elicit censure from pharmacologists (Holden, 2001). But this response is somewhat naïve (Holden, 2001; Redish, Jensen, & Johnson, 2008). Drugs of abuse function by mimicking or in other ways stimulating existing neurotransmitter systems. For instance morphine mimics the neurotransmitter endorphin, nicotine acts on cholinergic receptors, and amphetamine mimics the neurotransmitter epinephrine (Craig & Stitzel, 1990). Thus it should not be surprising that damage to specific brain systems can produce problems of impaired control resembling those seen in the impulse control disorders spectrum (Comings, 1995; Stein, Hollander, & Cohen, 1994) or the addictions (Redish, Jensen, & Johnson, 2008). For instance people with Obsessive Compulsive Disorder and Tourette's Syndrome both evince difficulty resisting an urge or an impulse to act (Phillips & Stelmach, 1996). Similarly Blum, Cull, Braverman, and Comings (1996) suggest that a weakness in dopamine receptors can lead to reward deficiency syndrome. In the former cases a biological weakness can lead to problems controlling urges, while in the latter cases the weakness appears to cause problems controlling the use of substances. Even though some of the behavioural addictions are sometimes considered to be of questionable validity (Shaffer, Hall, & Vander Bilt, 2000; Warden, Phillips, & Ogloff, 2004), it is reasonable to believe that there can be structural problems within the nervous system; for instance neural substrates associated with the limbic circuits of the basal ganglia (Blum et al, 1996) and dopaminergic dysregulation that contribute to problems of impulse control. Nevertheless, although there may be commonalties in the circuitry that may be stimulated or disrupted, the actual nature of the stimulation or disruption may be different from substance-related addictions. The issue is more whether behavioural addictions should be given equivalent status to pharmacological addictions (Holden, 2001) with gambling

researchers in particular debating this issue (Shaffer, 1996; Walker, 1989) and arguing that the magnitude of symptoms requires close consideration (Walker, Anjoul, & Milton, 2005).

Along an impulse control disorder spectrum of disorders as described by Hollander and his colleagues (Hollander, 1993; Blaszczynski, 1999a), there are conditions such as Obsessive Compulsive Disorder and Tourette's syndrome, where individuals give in to an urge to relieve anxiety or an impulse to carry out an act. In the Behaviorist literature, these conditions are associated with negative reinforcement (escape conditioning). At the other end of the impulse control disorder spectrum (Blaszczynski, 1999b) there are conditions such as Attention Deficit Hyperactivity Disorder, Sexual Compulsions, or Problem Gambling where individuals perform an inappropriate behaviour because it excites or rewards. In the Behaviorist literature, these conditions are associated with positive reinforcement (reward). Thus people can have problems controlling urges because they are anxious, because they crave excitement, or because of a combination of these positive and negative reinforcement schedules.

It is likely that technologies such as the internet, mobile phone and interactive television are not primarily addictive (Shaffer, Hall & Vander Bilt, 2000), at best promoting behaviour of the order of checking compulsions that distract from other activities (Baker & Phillips, 2007; Phillips & Reddie, 2007). Nevertheless these technologies may promote strong patterns of behaviour as they afford access to the object of interest (Griffiths, 1996; Griffiths & Barnes, 2008).

As indicated in Section 3, there are indications that both excitement and social withdrawal can characterise those individuals engaging in greater use of technology. The legalisation of gambling on mobile phones is liable to heighten risk for users that crave excitement, but realistically mobile phones will serve as a device that bridges that period of time when people do not have access to a computer work station or a television (Wei, 2008). The legalisation of gambling on interactive television is liable to have a greater impact upon the socially isolated, but it remains to be seen whether people will gamble at home for convenience (Wood, Williams, Lawton, 2007), or prefer to get out of the house (Thomas, Allen, & Phillips, 2008).

Such technologies already create problems when inappropriately accessed in the workplace (Case & Young, 2002; Greenfield & Davis, 2002; Lim, 2002; Young & Case, 2004). And in the case of mobile phones can generate unmanageable costs to consumers (Australian Communications Authority, 2004; Griffiths & Renwick, 2003). Nevertheless the number of individuals affected appear to be small (Phillips, Butt, & Blaszczynski, 2006; Phillips, Saling, & Blaszczynski, 2008) relative to benefits offered by these devices (Wajcman, Bittman, Jones, Johnstone, & Brown, 2007). The following sections consider factors that can moderate the degree of dispute.

6.2 Loss

It is a psychological fact that losers tend to blame external causes (Weiner, 1986). As a well known attributional error, losers tend to blame circumstance to maintain their self esteem (Higgins & Snyder, 1989; Weiner, 1986) (see http://www.watoday.com.au/national/big-loser-gambled-away-millions-in-seconds-20090519-be9l.html). This may contribute to persistence of gambling in the face of losses (Gilovich, 1983). After a sports betting task Gilovich (1983) found participants devoted proportionally more time discussing losses than wins. Although people spent more time

discussing losses, the effort was devoted to explaining them away. Gilovich (1983) observed that people engaged in biased evaluation, with losers focussing upon fluke events to explain away their loss. A consistent observation is that winning is perceived as due to skill, whereas losses are due to something beyond one's control (Holtgraves, 1988). For instance, Chau and Phillips (1995) manipulated outcomes during games of electronic blackjack. During winning streaks players attributed their success to ability, whereas during losing streaks players attributed their failure to luck. Indeed such cognitive distortions may prevent a proper identification of real biases during gambling tasks (Frank & Smith, 1989).

Biased evaluation has implications for subsequent behaviour. Problem gamblers endorse more superstitious beliefs (Joukhador, Blaszczynski, & Maccallum, 2004), and this may influence their response to losses (Brown, Rodda, & Phillips, 2004). Brown, Rodda and Phillips (2004) surveyed people before and after a gambling session. They found that problem gamblers were more upset after a loss than non-problem gamblers. Rosecrance (1986a) described horse race gamblers' attempts to maintain their self-respect by offering excuses as to why they lost. While some of the excuses employed invoked luck, a proportion of excuses made by gamblers focussed upon the fairness and conduct of the race. In some cases a loss (bad beat) leads on to problematic behaviour (Rosecrance, 1986b). For example Toneatto (1999) reviewed the cognitive distortions of gamblers and observed that gamblers tend to discount their losses and attribute purpose to non-animate gambling objects. Gamblers may verbally or physically abuse gaming machines for their losses (Toneatto, 1999). Hence it is likely that losses will sometimes lead to dispute for a proportion of gamblers.

6.3 Probity

Given that some forms of gambling using information and communication technology are exploiting legal loopholes, there are potentially grounds to support losers' disputes. There is plenty of historical literature associated with the concern as to the honesty and probity of providers of gaming products (e.g. Gibson, 1976; Houdin, 1904; Maskelyne, 1894; Taylor, 2003). Indeed unregulated casinos have no real constraints upon the honesty and integrity of the product they deliver (Scoolidge, 2006). It can be a comparatively simple thing to rig a computerised gambling game (e.g. Phillips & Amrhein, 1989). Conversely, the verification of the integrity and probity of gaming software is a complicated undertaking (Toneguzzo, 1996). Hence it should not come as a surprise that there are claims of impropriety associated with the operation of internet casinos. For instance Sévigny, Cloutier, Pelletier, and Ladouceur (2005) reported that the demonstration modes on internet casino websites deliver inflated and unrealistic impressions of the likelihood of winning.   Indeed there are a number of websites providing blacklists and claims of dishonest operators. For examples, see (http://www.slotsecretsonline.com/dishonestcasinosblacklist.htm) or (http://www.blackjackforumonline.com/content/Internet_Casino_Burn_Joints.htm). Accusations have been made that games such as blackjack do not operate in accordance with players' expectation, namely that cards are drawn from finite decks. These accusations have been directed towards electronic gaming machines (http://www.blackjackforumonline.com/content/crookedvideoblackjack.htm) or the internet (e.g. http://www.blackjackforumonline.com/content/Lucknrollalert.htm). Issues raised at these blacklist websites also involve deceptive offers, problems with accounting, dishonoured payouts, crooked software, bad customer service, and failure to respond to consumer complaints. Similar issues are emerging for mobile phones. A number of companies engaged in trivia and SMS competitions are already generating complaints (http://www.scamwatch.gov.au/content/index.phtml/tag/MobilePhoneScams). The ACMA

has warned individuals to be alert for deceptive messaging practices involving mobile phone calls that occur at premium rates (i.e. SMS calls that cost more than a standard call and hence transfer funds).

6.4 Blocks on funds transfer

In contrast with the simplicity of cash transactions, the ability to claim money earned from gambling may be complicated by a number of factors (US Government Accounting Office, 2002). As indicated previously the USA is seeking to place constraints upon the transfer of monies over state boundaries with the wire transfer act, in addition, the amounts may be monitored (Merzer, 2009). There may also be problems releasing winnings to people under certain circumstances. Internet casinos will allow people to play, but if the individual is under age, or their country of residence does not make allowances for internet gambling, then the *staker of monies may not be able to claim their winnings*. Hence the questionnable legality of some forms of online gaming is also generating potential areas of dispute for some consumers.

Where gambling occurs, dispute may arise simply because some people lose. Nevertheless, because providers of electronic gambling may exist outside of regulatory regimes there are concerns as to the probity of illegal gambling products. Government attempts to control a gaming activity may also restrict funds transfer, and *under age gambling may also cause problems collecting winnings*. The following sections address issues contributing to dispute, indicate factors that may exacerbate dispute, and any potential mechanisms for assistance in the advent of dispute and any untoward ill effects associated with gambling.

6.5 Standards of customer service

The electronic provision of gaming services can be perceived as a method of reducing costs by eliminating infrastructure and reducing staffing (Eadington, 1998; 2004). Nevertheless, there are problems as organisations use technology to reduce their costs, as there are standards to be met when delivering services to consumers over the internet or mobile phones.

There are standards for consumer service over the internet. For instance the governing body of the World Wide Web (W3C) provides guidelines for the usability and compatibility of platforms and devices (http://www.w3c.org.au/). Indeed this is necessary as an organisation's electronic competitors are only a click away (Nielsen, 2000). Nevertheless the extra care required to ensure usability may not be a paramount concern to some organisations, and this has generated dispute. For instance, the failure to provide alternatives for disabled consumers has generated dispute and unfavourable rulings for organisations such as the Sydney Organising Committee for the Olympic Games (SOCOG) (http://www.tomw.net.au/2000/mvs.html). Usability was not an irrelevant issue as the disabled were amongst the highest per capita users of the internet (Nielsen, 2000), and the government was involved when consumer rights were compromised. The relevant Australian guidelines may be found at http://www.humanrights.gov.au/disability_rights/inquiries/ecom/Webworking_paper.htm, while the American equivalent for this is Section 508 (http://www.section508.gov/). As consumers tend not to scroll (Nielsen, 2000) they may overlook important information (e.g. the fine print). The small screens on mobile phones only compound these problems. Hence this is an area where there is potential for further dispute.

As non-regulated casinos potentially have few constraints upon their operation (Scoolidge, 2006) it is perhaps not surprising that there are accusations of poor customer service (http://www.blackjackforumonline.com/content/Internet_Casino_Burn_Joints.htm). This in part reflects the nature of information and communication technology. By definition this technology places consumer at a distance, and as such causes greater problems for the resolution of dispute. It is not clear whether the consumer will know who to complain to, nor is it clear whether people will be willing to assist and resolve any dispute (Monaghan, 2009).

6.6 Deception on the Internet

Usability is not the only determinant of technology use (Trachinsky, Katz & Ikar, 2000), and attractive promises and inducements (Green & Jordan, 2002) are also likely to influence consumer behaviour. As will be outlined, there seems to be a greater likelihood for people to engage in deceptive practice over the internet using text based communication. Unfortunately the heightened potential for deception appears to be associated with a concomitant reduced tendency for people to be helpful over the internet, and this means gambling using information and communication technology potentially puts the consumer at greater risk. A relevant area of research that addresses online deception is that of online dating.

Online relationships and how people relate to each other has become an area of interest for psychologists and sociologists, particularly with the increased accessibility of people to the internet and chat rooms (Whitty, 2002). As impression management is important during dating, a related issue when considering online interactions between people is how prevalent online deception is (Friedman, Khan & Howe, 2000), and what sorts of people engage in it, given that a high proportion of people believe that on-line deception is common (Caspi & Gorsky, 2006). Research in this area has typically utilised chat rooms, which are electronic spaces online where people can communicate with either groups of people, or selected individuals and chat rooms are typically characterised by written rather than oral or other forms of communication (Cornwell & Lundgren, 2001).

It has been suggested that people enjoy using chat rooms because of the higher anonymity that they provide relative to face-face interactions (Cornwell & Lundgren, 2001). Suler (2004) has suggested that the use of text online affords the writer much more time to think and compose, and studies have observed the benefits conferred when the writer has additional time to put their thoughts on the web (Baker & Moore, 2008). A text-based interaction is seemingly anonymous, at least to the extent that feedback is not immediate (Suler, 2004). A face-to-face interaction imposes time pressure, and supplies a greater range of verbal and non-verbal cues that may promote anxiety, whereas text based communications obviate such pressures, reducing interpersonal anxiety, allowing the sender a greater control over their communication (Scealy, Phillips, & Stevenson, 2002), and this may assist shy individuals (Appana, 2008). Similar observations have been made for mobile phones (Reid & Reid, 2004). Indeed, Phillips, Saling, and Blaszczynski (2008) suggested that a preference for text instead of face-to-face communication reflected a motivation on the part of the communicator to control the interaction and the messages they send.

There is some evidence for a motivation to control interaction in the area of dating research. There are differences in messaging behaviours during dating (Byrne & Findlay, 2004). In a study of communication behaviour, Byrne and Findlay (2004) presented participants with a hypothetical vignette about meeting someone they were attracted to and that they might consider forming an exclusive relationship with. Participants were asked the

likelihood of initiating 'first contact' and a first date, and whether they would use the telephone or SMS. There were sex differences in initiating 'first-contact' and a first date (Byrne & Findlay, 2004). Females reported that they were more likely to initiate a 'first move' via SMS rather than a telephone call, while males were more likely to use the telephone in initiating a first date (Byrne & Findlay, 2004). Sex and role expectations play a role in the use of communication technology.

Considering on-line environments, Cornwell and Lundgren (2001) compared romantic relationships formed offline (termed 'realspace') versus cyberspace romantic relationships along a number of variables including the level of involvement in the relationship, how seriously they regarded the relationship and the tendencies for people to misrepresent themselves (e.g. age, background, physical appearance, gender). Data were provided from public on-line chat rooms by 36 males and 44 females that were aged from 18-55. Participants reporting on *'realspace' relationships had significantly higher levels of commitment and took their relationships more seriously* (both *p* <.01) than those who reported on cyberspace relationships. No differences were found on the potential for emotional growth or the degree of satisfaction reported by participants.

Whitty (2002) suggested that demographic variables are important in understanding how online relationships take place, and examined whether people were able to access emotional support and how open and honest they were about their age, gender, education, residence, occupation and income in chat rooms. The study included 320 face-to-face surveys in its analysis. Whitty (2002) found that the number of hours that people spent in chat rooms per week had a significant effect on their openness on the internet, with those spending longer (11-21+ hours) scoring higher on openness than those who spent a shorter amount of time. This suggests that as for offline relationships, the *development of trust in online relationships takes tim*e and that there is room for emotional growth.

Cornwell and Lundgren (2001) also considered the levels of deception on line. They found that *people were more likely to misrepresent their age online* (22.5%) than offline (0.5%). People were also more likely to lie about their physical features/attractiveness in 'cyberspace' (27.5%) than in 'realspace' (12.5%). Misrepresentation of all forms was higher overall online (50%) than offline (35%). Limitations with this study include that only 25% of people contacted were responders, and so generalisability may not be high. In addition, on-line chats have progressed and now commonly include the use of emoticons and web-cams that are able to provide participants who use them with much more information on-line that just a text-based interface.

In a study of discussion groups Caspi and Gorsky (2006) sought to determine the prevalence of online deception. In their survey of 257 Israeli discussion group users, 73% *believed that on-line deception was wide-spread.* However less than one-third of their sample (29%) had reported deceiving someone online. There was a discrepancy between perceived levels of deception and reported deceptive behaviour. The difference was suggested by the authors to arise because: 1) the smaller amounts of deception that people were exposed to was harmful; or that 2) participants adopted the mass media view that on-line deception is wide-spread. However, only a limited number of studies have explored this discrepancy and future work is needed to test either of these hypotheses. Trust on-line is likely to be a complex issue, and the nature of the interaction (e.g. financial disclosure versus on-line relationship) and the forum of the exchange (chat room versus web-site) is likely to affect how trusting people are (Friedman et al., 2000).

With respect to dishonesty, Whitty (2002) found an effect of the number of hours spent on-line, with those who spent a shorter time (0-2 hours) per week in chat rooms, lying more than those who spent a longer period of time (11-21+ hours). In addition, there was a significant effect of gender, with males lying more than females online ($p<.05$). Subsequent analysis was conducted to determine whether people lie for 'safety' reasons or so that others could not easily identify them. Women and younger people (17-20 years old) were found to lie for safety reasons, and younger women were found to *lie to maintain anonymity*.

Caspi and Gorsky (2006) also examined people's motivations for deceiving others. Their sample differed from some of the aforementionned studies, in that a large percentage of responders were female (68%), the mean age was 30 years, and included a greater age range (14-70 years) and 79% of respondents had a bachelors or post-graduate degree. They also found a differing pattern of results. In this study, there was no gender effect, and *those engaged in on-line deception were likely to be younger, more frequent users of the internet*. Caspi and Gorsky (2006) found that the issues that people lied about on-line were their sex (27%), their age (45%), their residence (44%), their occupation (21%) and their marital status (20%) and that the most common reasons for doing so were either privacy concerns or identity play. Caspi and Gorsky (2006) suggest that frequent users may deceive more often than non-frequent users because they have become comfortable with the technology. However, as this result was different to the research done by Whitty (2002) it may reflect the differences in the populations sampled, and reflect differences based in the demographics sampled in these two studies.

In a study looking at deception within an online forum, Birchmeier et al. (2005) considered archived posts and examined users' reactions to being deceived by a fellow group member. Birchmeier et al (2005) found what they deemed to be a 'black sheep effect' where members distanced themselves from the dishonest member and engaged in more condemnation of their actions (32% of responses in the 24 hours following revealing of the deceit) than supportive (13% of responses). *Deception elicits condemnation.*

Other research has also considered the effect that different media may have on the likelihood for people to tell a lie, and whether it is affected by the target of the lie. For example, Whitty and Carville (2008) had 150 students indicate on a Likert scale the likelihood of telling a lie upon a given media type (a lie that was either about themselves or about others) to someone that was close to them (family, partner, friend) compared with a stranger. It was found that people were more likely to tell a self-serving lie to someone not close to them regardless of the media (face, phone, e-mail) and more likely to tell other-oriented lies to people close to them than those less well known, with the authors suggesting that this may be to protect their feelings. Regarding media type, Whitty and Carville (2008) found that *people were more likely to tell a self-serving lie via e-mail*, followed by phone and then face-to-face, but there was no difference in telling an other oriented lie to someone close to them regardless of the media. Interestingly, participants also preferred email when delivering harsh truths as well, suggesting that people would be less inhibited in what they had to say to strangers on-line.

Phillips, Saling, and Blaszczynski (2008) suggested that the choice of a particular communication channel may indicate a preference to control the information and cues they reveal about themselves. Research on detecting lies has suggested three domains provide cues that may be useful (Hancock et al., 2004): 1) *observable behaviours* such as physical or

vocal cues including eye-movements, speech rate, stutters, facial expressions; 2) *physiological responses* such as a heart rate and galvanic skin response; and 3) *context* - the stories of liars make less sense in context, as their stories are fabrications. Restricting communications to text reduces many of the cues that a recipient might otherwise use to detect deceit (Phillips, Saling, & Blaszczynski, 2008).

Despite only limited research being done on detecting lies on internet or text-only based applications, Hancock et al. (2004) examined a number of features of conversations between 2 people (n=66 in same-sex pairs of university students) communicating via an on-line chat on subjects when one was asked to be truthful or deceitful in their answers. It was found that more words were used when the subject involved deception, and that those deceiving were more likely to discuss others in their responses. In addition, it was found that more words relating to senses were used (e.g. see, touch, smell) when a deceitful conversation was analysed, possibly reflecting a desire to come across as more believable in their story. The authors suggested that specific words may not be of use when detecting liars in text-based media. Nevertheless a pattern of linguistic use may be more evident during lies. *There was a tendency during lies for there to be longer responses, increased reference to others rather than to the self and use of more sense words* (e.g. see, touch, smell). Further research by Hancock et al. (2005) has demonstrated that how motivated a person is to lie may also reveal differences in the linguistic style, with the finding that highly motivated liars avoided using causal terms in text-based communications with a partner. Less motivated liars used more simple negations in their text-based communication. There is thus some research devoted to detecting lies from textual cues. In general forensic psychology indicates that malingerers overplay their roles (Hall & Pritchard, 1996). Hence *if an offer seems too good to be true, it probably is not true* (http://www.scamwatch.com.au/content/index.phtml/tag/FreeOffersOnTheInternet).

The ability to control the cues conveyed during messaging may confer benefits for the anxious, but other studies imply other motivations for controlling communications. Text reveals fewer cues from the sender, and by its asynchronous nature delays any feedback. The issues associated with internet communications also apply to mobile phones. Butt and Phillips (2008) used the NEO-FFI and found that people (n=112) high on the trait of Extraversion and low on Agreeableness spent more time using their mobile phone for making calls, and valued their calls less, whilst people high on the traits Neuroticism or Disagreeableness spent more time sending messages via SMS. This implies that there is a tendency for some individuals to prefer SMS text over face-to-face interaction, in situations where feedback as to the consequences of their behaviour might not be desirable (Butt & Phillips, 2008). As SMS were preferred by people higher in Neuroticism, and lower in Agreeableness, and Conscientiousness, it seems that SMS are more likely to be used for impulsive, or socially undesirable purposes.

Irrespective of the levels of reported willingness of individuals to act in a deceptive manner (Caspi & Gorsky, 2006), it is estimated that 96% of messages sent over the internet are actually spam (http://www.managementtoday.co.uk/search/article/786797/stat-month-inbox-intruders-96-proportion-e-mail-traffic-made-spam/). The list of scams over the internet continues to grow (http://www.scamwatch.gov.au/content/index.phtml/itemId/693900), and a proportion of these evade spam filters. Hence when people state that the internet is a medium that is predominantly deceptive in nature, they are not simply responding to media scares as Caspi and Gorsky (2006) suggested.

Internet scams tend to require a degree of cooperation from the victim in the form of supplied passwords or account details, but the situation is simpler for mobile phones. Scams also exist for mobile phones (see http://www.scamwatch.gov.au/content/index.phtml/tag/MobilePhoneScams), but in many cases inappropriate funds transfers occur simply by phoning a number (e.g. missed call scams). Communication technologies bring conman and grifters directly into the home and workplace from places that may be overseas and thus difficult to prosecute (see http://www.scamwatch.gov.au/content/index.phtml/tag/scamAboutUs/). As such deceptive practices are choking bandwidth and mail inboxes, and there have even been suggestions that emails should be charged at higher rates to address the problem (Kraut, Sunder, Telang, & Morris, 2005) (and see http://www.consumeraffairs.com/news04/2006/02/email_postage.html). As there is reasonable evidence to suggest deceptive behaviours are prevalent using communication technologies, there is a need to address potential sources of assistance for the consumer.

6.7 Helping behaviour on the Internet

Apart from the increased potential for deception using text based communication, the seeming anonymity conferred by text also has implications for work and socially responsible behaviours. Anonymity can be associated with reduced effort. This phenomenon is sometimes called social loafing and it occurs when any particular individual contribution is harder to identify and it is possible for individuals to share the benefits of the group (Piezon & Ferree, 2008). The act of group members to carry a social loafer is sometimes called the sucker role, and the tendency of individual group members to reduce their effort is sometimes called the sucker effect (Kerr, 1983). Therefore there are some potential rewards for anonymity in the form of reduced effort. There are some indications of this when considering discussion groups.

Within discussion groups, researchers have found the majority (i.e. 75%) of individuals tend to lurk and not participate (Preece, Nonnecke, & Andrews, 2004). Similarly observations were made by Phillips, Jory and Mogford (2007). In a study of discussion groups in the student environment Phillips, Jory and Mogford (2007) found that 60.9% of the 695 students in the course read messages. Of the 695 students only 18.6% actually posted messages. Of the students in this course, 77 answered a questionnaire on decisional style. Rational, avoidant and irrational decisional styles were examined. Those participants that were more prone to panic were more likely to post messages. Tracking statistics also implied that participants that were prone to panic were less likely to effectively use search engines to help themselves. This implies that those *people experiencing problems on the internet may be less able to help themselves*. Hence the likelihood that people will help others "at a distance" using communication technology will now be discussed.

Research has indicated a reduced willingness to assist people at a distance. For instance Weinberger (1981) noted that people were more likely to help people "in person", and less likely to help people who were asking for assistance over the telephone. It is likely the same phenomenon will occur over the internet.

Increasingly more social functions are being moved to or undertaken on the internet (Anderberg, 2007). People interacting with each other via a computer-mediated mechanism such as the Internet may be subject to the same laws of social psychology that traditionally apply when people are interacting via face-face contact or in groups (Markey, 2000).

Researchers have therefore sought to explain how people interact with each other on the internet using established theories from social psychology.

Many researchers have begun to consider helping behaviour on the internet, and have examined whether the 'social bystander' effect which inhibits helping behaviour in social group interactions also occurs online. The social bystander effect was originally described by Latane and Darley (1970) to explain why a group of bystanders in an apartment complex in the USA did not come to the aid of Kitty Genovese, despite her calls for help and assistance. One of the main findings of the bystander effect is that as group size increases, the probability of a person receiving help decreases (Latane & Nida, 1981).

Latane and Darley (1970) suggested that a bystander may be inhibited from helping because of a number of factors including:
1) *diffusion of responsibility* - individuals do not intervene as they assume that others will help instead;
2) *social influence* - people are influenced by other's actions and when they see others not helping they are less likely to help, or more likely view the situation as not requiring help; and
3) *audience inhibition* - people fear that their helping may be viewed negatively by others in the group.

Markey (2000) considered group size and the subsequent likelihood of receiving help via the internet. In this study it was hypothesised that as the number of people in a chat group increased, it would take longer for a person who requested help to receive it, but that help would increase and the time taken to do so would decrease when a bystander's first name was used in the request, because previous research has demonstrated that the bystander effect no longer occurs when people feel obliged to offer assistance (Latane & Darley, 1968). In the on-line study, over a 30 day period, 400 chat groups via Yahoo! Chat were observed for the responses to a simple request for help of "Can anyone tell me how to look at someone's profile" or a similar request where the name of a person in the chat was also used. The number of people present in the chat room ranged from 2-19 and a response was defined as any acknowledgment of the question. It was found that *assistance was given more quickly when help was sought using a participant's name* and in addition a weak relationship (r = .14) was found between the number of people in the room and the time taken to receive help. The authors suggest that the study provides evidence of the bystander effect occurring on-line and suggest that because the bystander effect has been found to be more prevalent in situations that are an emergency (such as participants covered in blood versus not covered in blood – see Piliavin & Piliavin, 1972), that the on-line helping effect may also be stronger if the situation were an emergency. There were however a number of limitations with the design and analysis of results in this study. Firstly, as any response to the question was deemed as 'helpful', Markey (2000) may have been including responses to the question that were not necessarily helpful. In addition to this, Markey (2000) did not examine participants alone, and so it is impossible to determine if there were differences between individuals and those in groups, and whether requests for help would generalise to other electronic media including e-mail (Blair, Foster Thompson & Wuensch, 2005). Finally, Markey (2000) examined only chat groups and not other forms of e-communication such as e-mail and bulletin boards which may differ.

Following on from the notion that using someone's name may obligate them to offer assistance, Gueguen (2003) tested the hypothesis that similarity between the sender of a

request for help and the receiver of the request will increase the rate of helping behaviour and decrease the time taken to respond. First name similarity was chosen because it has often been reported to be an important part of self-identity in research. In this study, 50 students received a survey via e-mail that they were asked to complete from a 'hypothetical student' from the same university. Half the respondents received the request from someone with the same name, the other half from someone with a different first name. Gueguen (2003) found that compliance with filling out the survey was significantly higher when the names were the same (72% compared with 44% completion rate) but that there was no difference in the time taken to respond to the request between the two groups. *Helping was greater when there was a perceived similarity between individuals*. This finding provides further evidence that the bystander effect does occur online and that a person contacted via the internet will feel more obliged to help if they perceive themselves as similar to the sender.

E-mail has a number of properties which may make it more conductive to helping behaviour when compared with chat groups. Barron and Yechiam (2002) suggested that the four properties that make e-mail conducive to help are: 1) it is an asynchronous medium, and help can be sought and received at the convenience of both parties; 2) the relevant lack of emotional cues can be useful if one does not want others to be aware of emotions associated with the request such as increased anxiousness or uncertainty; 3) there is convenient documentation of requests and the responses to them; and 4) e-mail is a less formal medium than face-face contact and it is therefore easier to cross functional and hierarchical lines within a company and ask for people's help.

In Barron and Yechiam's (2002) study an e-mail request was sent to either a single address or to a list where the naïve participant was one of five addresses. In addition to examining the bystander effect, this study was also interested in exploring whether it would make a difference if in a group situation a person who was perceived to be an 'expert' in the area was included. In order to simulate this, the request "is there a biology faculty in institution X" was sent to either the participant alone, or to the participant plus someone from that institution (i.e. expert) in the group of five, or the participant in a group of five where the other addresses were generic (e.g. hotmail, yahoo accounts). The subject pool for this study included 240 e-mail addresses from 2 servers at a university. The level of help received was classed as: a non- response; a helpful response; or very helpful response and the number of words in the response were also counted for data analysis. The authors found no significant differences between the two groups conditions and so they collapsed this variable for the remainder of analysis. It was found that more help and a greater level of helpfulness were elicited when the e-mail request went to a single recipient. Barron and Yechiam (2002) argued that in their design the additional recipients (e-mail addressees) constitute bystanders and the likelihood of a response decreases because of diffusion of responsibility similar to what happens in social group situations. As there was no difference between the generic and the expert group it was argued that a naïve participant perceives that the others included on the e-mail will be able to help even when there is no way for them to know this. However, this effect may equally be due to the simple nature of the query used in this study.

Blair et al. (2005) also conducted a study to test whether willingness to reply to an e-mail request from a person seeking assistance online decreases as number of others who may be considered as bystanders increases. This study included 400 students that were asked for help in finding articles via the library web-site from what looked to be another student. The authors included spelling mistakes in their e-mail request to increase the perceived likelihood it was written by a peer. The authors were interested in determining the response rate when

people receiving the e-mail were alone, or with 1 other, 14 others or 49 others added to the e-mail request and also how helpful their request was. Blair et al. (2005) found that two weeks after their request was sent, 99 participants (25% of the sample) had responded, and that *there was an association between the number of others receiving the request, the response rate and the helpfulness of the response* (which was classified as none, minimal, moderate, maximal). However, the authors noted that this relationship was not linear, and suggested that the bystander effect may occur online for certain group sizes, but that it may not hold with all group sizes. The authors argue that the results of their study reflect Tanford and Penrod's (1984) social influence model, which suggests that the way people act and their behaviour varies as a function of group size. This model suggests that groups of two operate similarly to individuals; that people are noticeably influenced by groups larger than three, and that a ceiling effect occurs where increasing the number of people no longer increases the group's influence.

Unfortunately there are a number of limitations with these e-mail studies; firstly none of the authors considered whether the e-mail requests were received by the participants. They may have been identified as SPAM. Secondly, the studies considered only university students who can be deemed as a cohort to have good skills using such technology and it is not clear from these studies whether such results generalise to other groups with less experience, who may be more willing to help with simple requests because of their own limited knowledge with such technology.

Another recent study considered the effect of group size on information sharing in very large groups (Voelpel et al., 2008). Voelpel et al (2008) suggested that knowledge sharing has become an important business practice and includes things such as: sharing corporate procedures; sharing of best practices; and helping behaviour related to specific queries about client cases. Voelpel et al. (2008) asked whether observed decreases in contributions to a knowledge forum might be related to the group size of the forum. The authors were also interested in how much effort people were willing to put in because large groups may not be the best because it becomes difficult to find information. The participants in this study were members of 333 Yahoo! Groups. Groups ranged in size from 7 to 10,532. Groups were sent the request "I'm so happy I found this group, how can I upload more than 1 picture at a time?" This particular request was chosen because there is more than one way to do this depending on the responder's level of expertise on the task. They found no significant linear relationship between group size and response rate or group size and time for responding. The quality of response and group size were also not correlated with each other. One difference between this study and others was the much wider range of group sizes. It had 101 groups with greater than 500 members (anonymity may reduce the risks associated with posting). The authors divided groups into categories based on the number of members: small (0-99); medium (100-250); large (251-500); and very large (500-10,523). They used the chi-square statistic to determine whether the likelihood of receiving a response was randomly distributed amongst group size. It was not, and medium groups replied less often. The finding that responding decreases from small (35%) – medium (11%) size groups does support the bystander effect, but this effect did not continue once the group size got larger (with 24% of large and 28% of very large members responding). Interestingly, there were also differences in quality of responses. More high quality responses came from small and medium size groups compared to large and very large groups. Anonymity in these larger groups may provide protection against audience inhibition and the authors also suggested that group norms (i.e. admiration for helping) in very large groups may also increase the rate of helping.

Despite the above findings, not all studies have found evidence of the bystander effect occurring on the internet. For example, Lewis et al. (2004) considered the effect of recipient list size on an e-mail request and the use of the priority sign when participants were asked to complete a web-based survey. In common with other studies, the participants in this study received the request either: alone; with one other; with 14 others; or with 49 others. Half the requests within each of these groups had a priority sign attached to the e-mail message. It was predicted that as group size increased, number of completions would decrease; that the time taken to complete the survey would increase and that those with the high priority sign would be more inclined to respond in a faster manner. 1200 participants enrolled in a university were sent the request and 165 completed the survey. The authors found no significant difference on the number of completions based on how many others were sent the survey using the same address list, and no effect of the priority symbol. The authors suggested that *a priority symbol may not be important in eliciting help*. It may also be viewed by the receiver as an imposition, or in requiring immediate help which they are not able to provide. The differences in helping behaviour findings in this study may also be related to the nature of the request. While some of the earlier research required participants to answer a simple question, a web-survey may be regarding as a greater imposition on a person's time, or to be associated with greater risk (e.g. it may be perceived as an internet scam).

Researchers have considered other factors that might influence online helping. For instance online helping behaviour may reflect how people judge the people making the requests. Accurate personality judgments are important for successful interpersonal interactions and whether to respond to others, to trust them, to befriend them etc. (Markey & Wells, 2002). Judgements as to the personality of the person making the request may influence whether assistance is given. Determining somebody else's personality traits is more difficult on the internet than in a face-face situation because one does not get cues that are associated with physical appearance such as facial expression or other gestures. Markey and Wells (2002) looked at the interpersonal interactions of 156 undergraduates in chat rooms for 15 minutes. Participants were either one-on-one or in groups of six. People who were asked to judge the personalities of someone based upon a **group interaction**, judged the individual less favourably than when people were asked to judge the personality of someone based upon a **one to one interaction**. As an *individual was perceived as being more "likeable" in a one to one setting*, this may explain some of the reduced helping behaviour when appeals for assistance are made in group settings.

Responses to requests for online assistance may also vary as a function of context. While some have argued that e-mail is a good media for helping behaviour (Barron & Yechiam, 2002), this may not always be the case, as it may vary as a function of what level of help is required. For example, Nuckles and Ertlet (2006) looked at how people communicate their computer problems over the internet to an online help-desk and the common problems encountered by 'experts' helping them solve the problem. They noted that people often fail to convey their intention to the expert and often they try things which produce new errors aimed at recovering their original goal, make incorrect judgements about what the expert thinks, or that they see exactly the same thing that the user does. Nuckles and Ertlet (2006) argued that *e-mail is a hard medium for this type of problem solving because of its asynchronous nature* and the cost of providing feedback or clarification is high in terms of time for the expert, the time taken to establish a mutual understanding between the user with the problem and the expert, and that the expert often deals with many requests at once.

In their experiment, Nuckles and Ertlet (2006) tested the use of a formulation script where people were prompted to include their goal (either at top of form, or used separate boxes for each prompt) while using the computer, as well as the steps they had tried to solve their problem so far, and a hypothesis on why they failed so far. This information was to guide the user to include relevant information which would help the expert solve their problem. They found that the script supported people in how to describe their problems with the computer. They also found the users' descriptions to be more extensive and to better represent the underlying problem. A subsequent regression analysis found that the representativeness (a qualitative feature of user's descriptions) was the crucial variable in the expert's ability to understand the problem. In addition to these findings, they found that the sequenced version of prompts (where separate boxes were used) was better than the non-sequenced version. In exploring the reasons for this, it was found that while the non-sequenced version increased the extensiveness of answers it did not change the representativeness or the ability of experts to solve the problem. This finding has implications for the structure of the decision aids used online. It also has implications for the mixed findings in the helping behaviour considered above. *Helping behaviour on the internet may require contextual information* to be included especially if it is for a harder task, or requires a novice to interact successfully with an expert on the task.

Research on helping behaviour on the internet is currently somewhat limited. Bystander effects and psychological distance imposed by the seeming anonymity of text based communication may reduce helping behaviour, hence chat rooms or discussion groups are of dubious utility. Nevertheless psychological distance can be reduced by personal appeal with improvements in helping behaviour. Some of the research considered above had demonstrated that the bystander effect does occur online, suggesting that social psychology principles are relevant to online behaviour. However, the application of the bystander effect to the internet may be subject to a range of other influences included the group size, the similarity of the sender to the receiver, the nature of the request for help and how much effort is needed to complete the request.

6.8 Electronic assistance

As indicated previously, the additional physical and psychological distance posed by the use of information and communication technologies means that deception is more likely, and assistance is less likely to be forthcoming, except where assistance is sought from a named individual. With the growing acceptance of the internet, psychologists have considered methods of assisting clients at a distance.

Although psychological theory would suggest increased deception and decreased helping behaviour over the internet, there has been an enormous growth in the call centre industry and, as a result, services provided by Psychologists, Psychiatrists and Social Workers are now offered in this environment. The evolving nature of technology means that these services are becoming more flexible and accessible: technology facilitates the client's ability to choose when and how services are used (http://www.psychology.org.au/).

The APS lists a number of forms of product that could be considered electronic therapies (http://www.psychology.org.au):
1.	Online/e-therapy (e.g. e-Couch);
2.	Combinations of information, therapy and moderated chatrooms (e.g. Anxiety Online);
3.	Health information sites (e.g. Better Health Channel, Health Insite);

4.   Brain training (e.g. cognifit);
5.   Blogs (e.g. No to depression);
6.   Chatrooms/forums without moderation or established credentials (e.g. Proanna);
7.   Social networking sites (e.g. Facebook, Twitter, MySpace).

As this is a rapidly developing area, the technology is not yet mature (Campos, 2004) and some of its applications may not be sufficiently well thought out. For example, Heinlen et al (2003a,b) examined how well websites offering "e-therapy" complied with the codes of ethics for the American Psychological Association (APA) and National Board of Certified Counselors (NBCC). These studies concluded that there was, poor or variable compliance with ethical guidelines overall. In addition, many of the websites/services were no longer available when re-visited only 8 - 13 months later. Heinlen et al (2003a, b) were also concerned about clients' privacy. Some forms of therapy involving chatrooms lead to concerns as to provision of standards of privacy, security and confidentiality of records (Wang, Lee, & Wang, 1998), suggesting a need to regulate electronic therapy providers (Maheu & Gordon, 2000).

Maheu and Gordon (2000) surveyed providers of internet assistance. The major forms of services provided were counselling, education or advice, using email or websites, but some services were provided in chat rooms. Only half of these providers of internet services made provision to deal with sudden crisis. Proponents of email based therapy argue that it is convenient (Barak, 1999; Barron & Yechiam, 2002), but as email is an asynchronous activity, and providers may reside in different time zones, there is a real possibility that a serious crisis is ignored.

The decomposition of a therapeutic session to a chain of disconnected emails means that clients have more time to reflect, and this may encourage expression and self-reflection (Suler, 2004), and may allow counsellors to feed supplementary information to clients more readily (Rochlen, Zack, & Speyer, 2004). On the other hand the asynchronous form of interaction, coupled by the absence of non-verbal cues may create problems for therapeutic interaction (Mallen, Vogel, Rochlen, & Day, 2005) as even the verification of clients' identities can be problematic (Campos, 2006; Rochlen, Zack, & Speyer, 2004).

Mallen, Vogel, Rochlen, and Day (2005) drew comparisons between online therapies and the generally accepted use of the telephone to support counselling activities. The majority of psychologists report using the telephone to conduct routine business activities and the direct provision of care for clients. Mallen, Vogel, Rochlen and Day (2005) indicated that one of the strengths of computer-mediated forms of the communication was the potential to assist individuals that were isolated. Hence such technologies have a potential to assist individuals who have experienced problems as a result of gambling "at a distance". Available research has suggested guarded support for the efficacy of online therapies (Rochlen, Zack, & Speyer, 2004) particularly for isolated individuals (Campos, 2006; Mallen, Vogel, Rochlen, & Day, 2005), but recommended more research in this area.

Some care is required during the conduct of online therapies. Therapists need to be aware of time zone differences, and the fact that differences in literacy and technological capability may mean that some individuals may be more amenable to an online mode than others (Mallen, Vogel, Rochlen, & Day, 2005). In addition, the slow and asynchronous mode of email may mean it takes longer to develop therapeutic rapport (Mallen, Vogel, Rochlen, &

Day, 2005). As high drop out rates have been reported for internet therapies, this indicates that online therapies may not be for everyone (Pier, Klein, Austin, Mitchell, Kiropoulos, & Ryan, 2006).

In addition to therapies involving some degree of interaction with a therapist, there are also a variety of self-help programs that are available on the internet (Andersson, 2006). Cognitive Behaviour Therapy is particularly amenable to the creation of self-help programs on websites (Andersson, 2006). Such systems involve a series of instructions and exercises for people to follow. Griffiths, Farrer, and Christensen (2006) have reported that self-help websites in Australia have been efficacious in treating depression.

Advances in gaming technology mean that consumers can develop a gambling problem "at a distance". However technology also offers methods of assisting the consumer in remote locations. For quite some time technology has allowed counsellors to interact with clients over the phone, but other modes are now available using text, or self help programs. Some of the less formal methods of assistance (e.g. chatrooms) cause concerns about privacy, and research on helping behaviour suggests that people using some forms of electronic therapy (e.g. discussion groups and chat rooms) are unlikely to receive assistance. The Australian Psychological Society has already worked on guidelines for the provision of psychological services and products over the internet (Australian Psychological Society, 2004; Bradley, 2003).

6.8.1 Emerging technology and counselling
Broadband internet has the potential to foster problem gambling through 24/7 access to gambling sites, however it also provides a possible means for those gamblers to address their problem through internet-based treatment programs. While the provision of mental health care services over the internet is not new, programs aimed at problem gambling (based on addiction research) have reportedly only recently been developed and implemented in a number of countries (Monaghan & Blaszczynski, 2009). There are however a number of issues associated with providing on-line mental health care services that currently remain unresolved thereby making the provision of such services somewhat contentious.

The Australian Communications and Media Authority have reported that by 30 June 2008 all Australians had access to broadband internet through, at a minimum, relatively slow satellite technology (Australian Communications and Media Authority, 2008). In April 2009 the Federal Government released its optical fibre-based "super fast" National Broadband Network plan designed to upgrade internet capabilities by delivering speeds of up to 100 megabits/sec (i.e. 100 times faster than currently available) to 90% of the population with the remainder, those living in remote parts of the country, able to access the internet at speeds of 12 megabits/sec through next generation wireless and satellite technologies. The National Broadband Network then was to ensure "Every person and business in Australia, no-matter where they are located, will have access to affordable, fast broadband at their fingertips" (Media Release, 2009).

Such "super fast" broadband permits large amounts of data to be broadcast including the simultaneous transmission of high quality video and audio data in real time. Ostensibly then, all Australians have the ability to access live, interactive, internet-based applications 24 hours a day, 7 days a week regardless of their geographical location. One such application is videoconferencing.

An increased use of videoconferencing in Australia is enabled by the increasing access to broadband. Indeed, Phillips, Jory, Wijenayake, and Hii (2010) observed that as broadband access increased amongst University students, so too did their use of videoconferencing/webcams (see Figure 6.1). As more Australians begin to use "super fast" broadband then, the expectation is more Australians will engage in videoconferencing.

Student VideoConferencing Capability
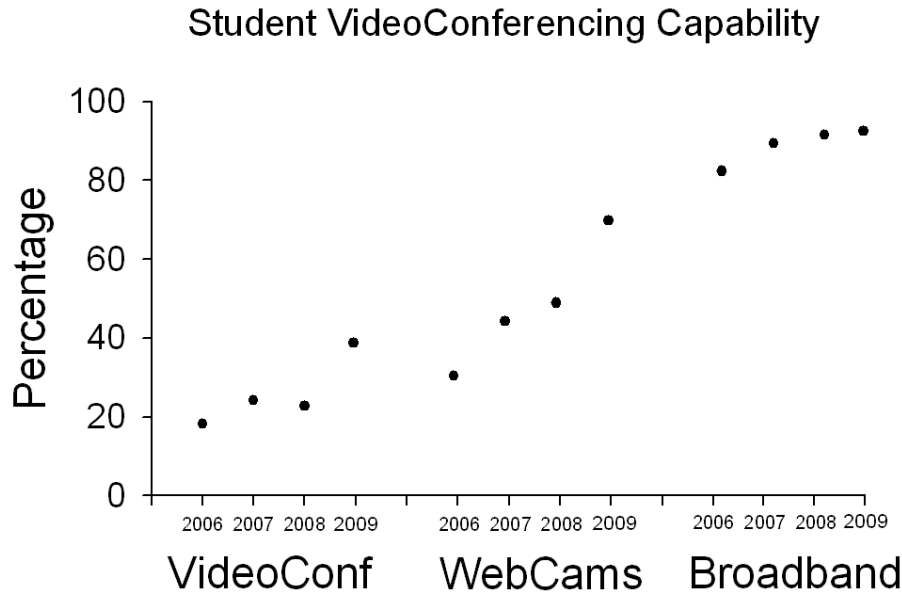
Figure 6.1. Increasing use of videoconferencing and web-cams amongst University students as uptake of broadband technology increased (Phillips & Jory, 2009)

Videoconferencing over the internet has found use in areas as diverse as educating Australian farmers (Hargraves & McCown, 2008), delivering lectures to tertiary students in rural locations (Phillips, Jory, Wijenayake & Hii, 2010) and supervising rural psychologists (Gibson, Miller & King, 2007). It has also impacted significantly on mental health care since the live, high quality, two-way audio and visual data streams allows mental health practitioners to accurately note the verbal and non-verbal cues (e.g. changes in facial expression, tone of voice, degree of eye contact etc.) considered important to the therapeutic process. It therefore offers the possibility of reducing the psychological distance imposed by technologies such as email or telephone, and so has potential as an alternative to in-person interactions. Videoconferencing over the internet then has the potential to make mental health care accessible to a broader section of the community including the physically immobile and those in geographically remote locations.

The potential of videoconferencing to increase patient accessibility to mental health care while simultaneously decreasing service costs was predicted to give rise to significant growth in both the provision and use of online counselling services. In 2001 for example a panel of 62 US mental health professionals with an average of 30 years clinical experience and all holding a doctorate were asked to predict the state of aspects of psychotherapy in the year 2010. Using Delphi methodology (see for example, Adler & Ziglio, 1996) the panellists contended that therapy delivered via the telephone, internet or virtual reality "should expand in the first decade of the millennium" (Norcross, Hedges & Prochaska, 2002, p. 319). While

there can be no doubt as to the accuracy of that prediction there is considerable confusion in the literature as to the efficacy of such therapy.

A major contributor to that confusion is the inconsistent terminology used to describe the different forms of online counselling services available (Richardson, Frueh, Grubaugh, Johnson, Egede, & Elhai, 2009). "Telepsychiatry" for example has been used by a number of authors to define psychiatric services delivered via videoconferencing (Urness, Wass, Gordon, Tian & Bulger, 2006; Hyler, Gangure & Batchelder, 2005; Jones, 2006). However, Yellowlees (2001) appears to use "telepsychiatry" and "telemedicine" interchangeably while Poon, Hui, Dai, Kwok and Woo (2005) use "telemedicine" to describe the provision of psychological (rather than psychiatric) services delivered via videoconferencing. Similar confusion exits for other terms. Midkiff and Wyatt (2008) for example view "etherapy" as involving only email interaction with a therapist whereas Abbott, Klein and Ciechomski (2008) claim it typically also involves a structured, web-based treatment program. Despite the confusion surrounding terminology a number of attempts have been made to review the literature in order to assess the efficacy of therapy delivered over the internet.

Hyler, Gangure and Batchelder (2005), using PsychINFO and Medline databases as well as bibliographic examination from literature reviews, undertook a meta-analysis of the telepsychiatry literature from 1956 to 2002 in an effort to determine if assessment via telepsychiatry using standardised scales such as the Brief Psychiatric Rating Scale and the Mini-Mental State Exam, yielded similar results to "in person" (I-P) assessment. They reported that despite some 40 years of telepsychiatry research, most published studies to that time provided either project descriptions or focussed on patient/clinician experiences or satisfaction with telepsychiatry rather than on its clinical effectiveness. None-the-less, they were able to identified 14 studies involving a total of 500 patients which met their inclusion criteria. Using a fixed-effects model to calculate effect sizes (Es) they concluded that "…telepsychiatry was similar to I-P psychiatry for a variety of objective assessment measures" (p.411) but felt further work was warranted before drawing a more definitive conclusion owing to the "rather large" confidence intervals associated with their findings. They were unable to make any direct comparisons between telepsychiatry and "in-person" for on-going treatment due to the paucity of controlled studies in that area at the time.

Focussing on implementation of psychological interventions rather than assessment, Barak, Hen, Boniel-Nissim and Shapira (2008) also undertook a meta-analysis. Using PsychINFO and Medline databases along with Google Scholar and Scopus search engines they found articles relevant to internet use for "psychotherapeutic interventions" published up to and including March 2006. In addition, they examined the bibliography of various articles in an attempt to detect items missed using the other search techniques. Aware of the issues with terminology they classified as "etherapy" any on-line treatment involving communication with a therapist regardless of the means of communication e.g. email, teleconferencing, chat-based etc. "Self-help" (or "web-based") therapy was deemed to involve clients using the internet to access and complete appropriate self-help modules without communicating with a therapist. "Internet therapy" (also referred to as "Internet-based therapy" and "Online therapy"), while not clearly defined by the authors, appears to be a combination of etherapy and self-help therapy. That is, "internet therapy" seems to refer to the delivery of any intervention involving a therapist, self-help modules and the internet regardless of the mode of delivery (e.g. email, chat, teleconferencing, videoconferencing, interactive/static websites etc). It is not clear if the term also includes interventions involving both communication with a therapist *and* self-help modules.

As with Hyler et al (2005), the meta-analysis by Barak et al (2008) also used a fixed-effects model to calculate effect sizes in the 92 studies involving 9,764 clients that met their inclusion criteria. They found the overall average effect size for internet-based therapy to be 0.53 and also noted no statistically significant difference in average effect sizes existed between etherapy and web-based therapy (Es = 0.46 and 0.54 respectively) and so concluded them to be equally efficacious. Further, they calculated the "average effectiveness" of face-to-face interventions to be 0.53 based on various reviews of the efficacy of face-to-face psychotherapy and noted it was comparable to the average effect size for internet-based therapy. Ultimately then, they concluded that "….Internet-based therapy, on the average, is as effective, or nearly as efficacious, as face-to-face therapy" (p.141). Further supporting that claim they identified 14 randomised trial articles which directly compared "internet-based" treatments with face-to-face treatment of the same problem and again found no significant difference in average weighted effect sizes between the two groups (internet Es = 0.39, face-to-face Es = 0.34). The authors noted the average weighted effect sizes for those two groups was significantly lower than the overall average effect size for internet-based therapy of 0.53 but were unable to explain that difference.

Antonacci, Bloch, Saeed, Yildirim and Talley (2008) undertook a literature review of the telepsychiatry literature with specific focus on the effectiveness of videoconferencing in mental health diagnosis and treatment. Using PsycINFO, Medline and the Telemedicine Information Exchange they searched the literature from 1950 to June 2007 for relevant articles eventually finding 45 that met their inclusion criteria. They reported that although results appeared to be the same for the few studies that used standardised treatment and outcome measures when comparing telepsychiatry to face-to-face therapy, the treatment was usually limited to medication management or a short, CBT-centred course rather than traditional psychotherapy. Even when psychotherapy was delivered via telepsychiatry it was often coupled with face-to-face contact as well thereby confounding the outcome. Other concerns identified include an overall lack of controlled efficacy studies focussing on the delivery of psychotherapy rather than general psychiatric services, an emphasis on client/clinician "satisfaction" as the primary outcome measure rather than clinical effectiveness, shortcomings in the way the service was costed, the failure of studies to deal with missing data (e.g. from missed appointments) and a lack of clarify in identifying the exact conditions under which tele-mental health is more beneficial to the patient than in-person consultations (Richardson et al, 2009).

Curiously, there is very little overlap in the articles used by Hyler et al (2005), Antonacci et al (2008) and Barak et al (2008) despite citing a total of 300 references between them. While the emphasis of the three bodies of work differed, it is nonetheless surprising that no articles cited in Antonacci et al's (2008) work appear in Barak et al's (2008) meta-analysis, only one article used in Hyler et al's (2005) meta-analysis is also used by Barak et al (2008) and only eight articles from Hyler et al's (2005) work are included in Antonacci et al's (2008) work, even though all authors undertook a review querying the same databases during overlapping periods of time. It may be that the shortcomings identified by Antonacci et al (2008) regarding comparisons between telepsychiatry and face-to-face therapy explain the lower than expected effect sizes reported by Barak et al (2008) when they compared "internet-based" treatments with face-to-face treatments. Barak et al's (2008) use of the relatively vague term "internet-based" treatments, rather than their more clearly defined "etherapy" and "self-help/web-based" therapy raises the prospect their meta-analysis

included articles where on-line interventions involved both communication with a therapist and self-help modules, a confounding effect recognised by Antonacci et al (2008).

Aside from methodological concerns, ethical and legal problems surround the provision of telepsychiatry/internet-based therapy services. Such problems include confidentiality, risk management and potential licensing/jurisdictional issues where services involving a therapist occur between states/countries (Smith & Reynolds, 2002).

Confidentiality concerns include an inability to guarantee the safe storage or destruction of therapist/client communications once therapy has concluded and/or an inability to guarantee therapist/client communications cannot be intercepted by a third party.

Issues associated with risk management centre on the ability of clinicians to accurately but remotely assess the mental state of clients in crisis and, if suicide is considered a real possibility, to take effective steps to contact the appropriate services. Difficulties can arise where the clinician and client are located in different regions or jurisdictions and the therapist does not know what services are available to the client within that region/jurisdiction or how to contact them. The situation can be compounded when the client seeks to deliberately mislead the therapist about their true location owing to habitual distrust or, more seriously, when they wish to avoid mandatory reporting as would be the case if the client intended physical/sexual abuse. However, geolocation technology makes it increasingly difficult to misrepresent ones physical location on the internet (see Section 6.9 Dispute, location and emerging technologies).

Jurisdictional issues include different licensing requirements between states/countries making it difficult for clients to establish the bona fides of a practitioner located in another country leading to the possibility of unqualified people acting as therapists.   They can also serve to complicate any legal issues that might arise between client and therapist since it is unclear if the laws applicable to the state/jurisdiction of the practitioner or the client should apply (Midkiff & Wyatt, 2008).

Despite its problems, the literature abounds with reports claiming internet-based treatments to be as efficacious as face-to-face therapy particularly where those treatments are delivered via videoconferencing. Indeed, treatment involving videoconferencing is reported to be as efficacious as face-to-face therapy in dealing with conditions including depression (Ruskin, Silver-Aylaian, Kling, Reed, Bradham, Hebel, Barrett, Knowles & Hauser, 2004); alcohol or drug dependence, bipolar/personality/eating disorder etc (O'Reilly, Bishop, Maddox, Hutchinson, Fisman & Takhar, 2007); schizophrenia, schizotypal, and delusional disorders; affective disorders (De Las Cuevas, Arredondo, Cabrera, Sulzenbacher & Meise, 2006) and in improving the cognitive functioning of the elderly with mild dementia/cognitive impairment (Poon, Hui, Dai, Kwok & Woo, 2005). Work has even begun in developing internet-based treatments for problem gambling. Such programs, based on addiction research, have reportedly been implemented in a number of countries recently (Monaghan & Blaszczynski, 2009).

In light of the apparent lack of a thorough meta-analysis of all relevant literature, possible confounding effects, large confidence intervals and confusion in terminology, support for the efficacy of mental health services delivered over the internet should currently be considered as "guarded" at best.

Although all Australians ostensibly have access to broadband internet and hence videoconferencing, not all of them engage in that activity. Ongoing surveys of young, better educated cohorts suggest that while 70% possess the necessary hardware, only 39% already videoconference (see http://www.hcsnet.edu.au/files2/program_v2mf.pdf). It is anticipated that figure will increase with improvements to suitable, low cost software (e.g. Skype, ChatRoulette, Vdate). From ongoing trials it appears such software is currently less functional/usable than the more costly, better videoconferencing systems (e.g. Webex).

With the extensive penetration of broadband on the Australian mainland, increasing broadband speeds and decreasing cost of hardware and software, barriers to the introduction of videoconferencing as a means of therapy are such that it could be widely implemented within a couple of years. However the issues of efficacy, confidentiality, risk management and potential licensing/jurisdictional problems are likely to take longer to resolve.

6.9 Dispute, location and emerging technologies

It has previously been assumed that the distances associated with the use of information and communication technology for the purposes of gaming pose problems for the consumer in terms of their ability to identify and locate appropriate individuals to complain to in the advent of dispute. With emerging technologies this is not necessarily the case. There are a variety of geolocation technologies under development that can locate individuals that are using information and communication technologies. This geolocation technology can be used to determine whether the person seeking to gamble online actually resides in a jurisdiction that allows online gambling.

When purchasing a mobile handset users are assigned a variety of numbers apart from their (dialable) mobile number. One such number is the International Mobile Subscriber Identity number (IMSI number) stored in the phones SIM (Subscriber Identity Module) card. The IMSI is a unique, non-dialable number usually 15 digits long and contains three pieces of information that the handset automatically sends to the network (see https://www.numberingplans.com/?page=analysis&sub=imsinr):

1) The Mobile Country Code (MCC): A three-digit number that specifies the country from which the SIM card originated. The International Telecommunications Union has assigned an MCC to each country with Australia's MCC defined as "505" (ITU E.212)
2) The Mobile Network Code (MNC): A two-digit number that defines the network carrier the user has subscribed to. In Australia for example, Telstra's has the MNC of "01"; Optus has "02"; Vodaphone has "03" etc.
3) The Mobile Station Identification Number (MSIN): This number makes up the remaining digits of the IMSI and provides reference to user information such as address, account status, current location etc and is used in call control and processing.

The IMSI then specifies the country and network to which a subscriber belongs and so can identify the subscriber as a non-local. Such information is of particular relevance to international roaming as it allows local service providers to determine if they have a roaming agreement with the originating country/network and hence if the subscriber should be granted access to the local network.

Since IMSI numbers are defined by international standards, are well-known and are automatically sent to the network when a call is made, service providers in foreign countries

are readily able to identify the country of origin of a voice call. Note that since the IMSI number differs to a mobile number and it is the IMSI number that is sent to the network, the privacy of the user is not violated. Identifying the country of origin when a subscriber uses their mobile handset to access a website is however, less straight forward.

When a users requests a URL on their mobile handset the request and identifying information about the user are forwarded to the internet service provider (ISP- Bigpond for example). The identifying information is used by the ISP to bill the customer and is kept within their domain to protect customer privacy. With identifying information removed the URL request is subsequently submitted to the internet along with an internet protocol (IP) "address". An IP address is a series of unique numbers used to identify the device making the request and is needed so that the requested site knows where to send the response. Addresses can be either statically or dynamically assigned with a "static" address permanently assigned to a specific device and a "dynamic" address temporarily assigned from a pool of addresses and returned to that pool for subsequent re-use after a period of time (e.g. at the conclusion of an internet session). Users of a device with a static IP address then have the same address whenever they access the internet from that device whereas users of a device having a dynamic address do not.

Assigning IP addresses to countries is the task of the Internet Assigned Numbers Authority (IANA). For example, internet service providers in Australia have been assigned IP addresses within various numerical ranges including those from 58.65.248.0 to 58.65.255.255 (see http://www.ipaddresslocation.org/ip_ranges/get_ranges.php). Addresses within a range are further sub-divided and allocated to a specific physical site housing telecommunications hardware such as routers, servers, switches etc.

Since the assigned number ranges are both country-specific and public knowledge it is a simple matter for off-shore service providers to determine the country of origin of a mobile-handset generated internet request. The service provider simply captures the IP address associated with the request and uses geo-location software to determine the origin of that request. The accuracy with which the origin of the request can be located depends on the software used. "IP2Location" for example appears to have established databases of the physical location of specific address ranges over a period of time and claims to be able to provide not only the country, state and city of origin but also latitude, longitude, postcode, time zone, connection speed, ISP and domain name, international direct dial country code (e.g. 61 for Australia), area code and both the name and identity number of the nearest weather station (see http://www.ip2location.com/)

Although it is technically possible for on-line casinos to identify and block mobile-handset generated internet requests originating from countries where on-line gambling is prohibited, such action involves costs. Costs include not only the cost of buying and maintaining the capture/geo-location software but also the cost of reduced revenue resulting from taking such action. In addition, the difficulty in enforcing national laws internationally means there are few legal consequences to operators who accept bets originating in countries where on-line gambling is prohibited. Despite the costs involved it has been reported that while not all internet gaming sites block access to requests originating in Australia, the larger sites do and use geo-location technology for that purpose (FaHCSIA, 2009).

Access to prohibited sites can also be restricted through regulation by the authorities in countries that prohibit on-line gambling. Australia has adopted that approach through the

Interactive Gambling Act (2001) which makes it an offence to provide interactive gambling services to customers and to advertise such services in Australia. The Act did not specify the technology to be used in filtering overseas sourced material but instead sought proposals, in the first instance, from industry as to procedures/technology it considered appropriate. The Internet Industry Association responded with an industry code outlining procedures and specifying filters it considered capable of meeting the requirements of the Act on the basis of factors such as ease of installation, ease of use, configurability, availability of support etc. The code came into effect on 31 December 2001 (IIA, 2001).

Since identifying the origin of an on-line request is done using the IP address associated with that request, a sophisticated user can attempt to mask their true IP address and hence the true origin of the request. Such an approach usually involves a proxy server. The proxy server sits between the device originating the request and the server able to access the requested information. The requesting device sends its IP address to the proxy which then evaluates the request and, if valid, connects to the appropriate server requesting the required information on behalf of the client. In addition to acting as a go-between, a proxy server can provide a number of functions including acting as an "anonymiser" for those seeking online anonymity. In that capacity, the server able to access the requested information receives a request from an anonymising proxy server and so does not receive any information about the address of the originating device. Anonymising servers provide a means for political dissidents, hackers, whistleblowers, cyber-criminals and those interested in freedom of speech to undertake their activities with some degree of anonymity.

For consumers that are engaged in dispute with an organisation there may be some potential capability to locate the staff they are in dispute with. For instance a range of websites offer the potential to *locate IP addresses* (e.g. http://www.find-ip-address.org/), but with varying degrees of accuracy (the IP address is actually more useful in gaining access to the person's computer).

As the location of a mobile phone can be determined from signal strength in relation to phone towers, there is also the capability to *locate the phone user* (Giovanni & Oliviero, 2008). Indeed, dating software and games have been developed to use this capability (see http://www.grindr.com/Grindr_iPhone_App/What_is_Grindr.html). For instance, in the game "botfighter", participants register with a server, and then utilise the location aware software provided to stalk and then "kill" opponents using SMS (Bennahum, 2001).

Poker has been suggested as being a potential game that could also be developed to use the same mobile multiplayer gaming technology (see http://www.gsm-3gworldseries.com/newt/l/gsm/article_view.html?artid=20017495638). Subscribers to such games sacrifice a degree of privacy to their opponents (Wang, Lee, & Wang, 1998) and this has been a concern within certain jurisdictions (Souza, 2006). As such games already offer the capability to locate online players, it is possible that losing players may use this location aware capability to locate opponents to air their grievances physically (Bennahum, 2001).

6.10 Summary

Where there is potential for loss, there is also potential for dispute. If dispute occurs, the traffic of messages may occur between the staker of monies and the organisation offering the initial proposition and other parties involved in the transaction. As has been outlined, the psychological (and physical) distance between the person seeking assistance and the provider of the gaming product can be much greater when gaming occurs using information and

communication technology, and this has implications for dispute resolution. Indeed, in many cases the distance may mean that state or international borders may be crossed. Recent experiences with the internet indicates that governments will be involved in disputes (e.g. France and Nazi memorabilia; child pornography), and that organisations hosting these services will be targeted (e.g. internet service providers operating in China). Where a consumer is distressed, help is more likely to be forthcoming from named professionals than anonymous individuals (e.g. discussion groups). Some forms of assistance such as online counsellors are likely to be more effective than others such as chat rooms and email. Hence there will be a need for specific dedicated forms of assistance for problems associated with online forms of gaming.

6.11 References

Abbott, M. (2006). Do EGMs and problem gambling go together like a horse and carriage? *Gambling Research, 18*(1), 7-38.

Abbott, M. J-A, Klein, B and Ciechomski, L. (2008). Best Practices in Online Therapy, *Journal of Technology in Human Services, 26*(2), 360-375

Adler, M and Ziglio, E (Eds) (1996): Gazing into the oracle : the Delphi method and its application to social policy and public health. London: Jessica Kingsley Publishers.

Anderberg, P. (2007). Peer assistance for personal assistance: analysis of online discussions about personal assistance from a Swedish web forum for disabled people. *Disability & Society, 22,* 251-265.

Andersson, G. (2006). Transferring cognitive behavioural interventions to the internet: Can it be done? *InPsych*, April [downloaded 8th May from http://www.psychology.org.au/publications/inpsych/cognitive/]

Antonacci, D.J; Bloch, R.M; Saeed, S.A; Yildirim, Y & Talley, J (2008): Empirical evidence on the use and effectiveness of telepsychiatry via videoconferencing: implications for forensic and correctional psychiatry. *Behavioral Sciences and the Law, 26*, 253–269.

Appana, S. (2008). A review of benefits and limitations of online learning in the context of the student, the instructor, and the tenured faculty. International *Journal on E-Learning, 7*(1), 5-22.

Armstrong, L., Phillips, J.G., & Saling, L.L. (2000). Potential determinants of heavier *Internet usage. International Journal of Human Computer Studies, 53*, 537-550.

Australian Communications Authority (2004). Not waving, drowning in debt: Young people and debt in Australia. *Consumer Bulletin, Summer 2004*(23), 6-9.

Australian Communications and Media Authority (2008). Communications Report 2007-2008.

Australian Psychological Society. (2004). APS Guidelines of providing psychological services and products on the internet. Melboune, Vic: Author.

Baker, J.R. & Moore, S.M. (2008). Blogging as a social tool: A psychosocial examination of the effects of blogging. *CyberPsychology & Behavior, 11*(6), 747-749.

Baker, J.R. & Phillips, J.G. (2007). Email, decisional styles and rest breaks. *CyberPsychology & Behavior, 10(5),* 705-708.

Barak, A. (1999). Psychological applications on the Internet: A discipline on the threshold of a new millenium. *Applied and Preventive Psychology, 8*, 231-246.

Barak, A. Hen, L., Boniel-Nissim, & Shapira, N. (2008). A comprehensive review and a meta-analysis of the effectiveness of Internet based psychotherapeutic interventions. *Journal of Technology in Human Services, 26*, 109-160.

Barron, G., Yechiam, E. (2002). Private e-mail requests and the diffusion of responsibility. *Computers in Human Behavior, 18,* 507-520.

Bennahum, D.S. (2001). Be here now. [downloaded 5th May 2009 from
        http://www.wired.com/wired/archive/9.11/location.html]
Bianchi, A., & Phillips, J.G. (2005). Psychological predictors of problem mobile phone use.
        CyberPsychology & Behavior, 8(1), 39-51.
Birchmeier, Z., Joinson, A.N., & Deitz-Uhler, B. (2005). Storming and forming a normative
        response to a deception revealed online. *Social Science Computer Review, 23,* 108-
        121.
Blair, C.A., Thompson, L.F., & Wuensch, K.L. (2005). Electronic helping behaviour: The
        virtual presence of others makes a difference. *Basic and Applied Social Psychology,
        27,* 171-178.
Blaszczynski, A. (1999a). Pathological gambling and obsessive compulsive spectrum
        disorders. *Psychological Reports, 84*, 107-113.
Blaszczynski, A. (1999b). Pathological gambling: an impulse control, addictive or obsessive-
        compulsive disorder? *Anuario de Psicología, 30(4)*, 93-109.
Blum, K., Cull, J.G., Braverman, E.R., Comings, D.E. (1996). Reward deficiency syndrome.
        American Scientist, 84(2), 132-139.
Bradley, P. (2003). Psychological serices online: Some issues for practitioners. *InPsych,*
        December [downloaded 8th May from
        http://www.psychology.org.au/publications/inpsych/online/]
Brown, S.L., Rodda, S. & Phillips, J.G. (2004). Differences between Problem and non-
        problem gamblers in subjective arousal and affective valence amongst Electronic
        Gaming Machine players. *Addictive Behaviors, 29*, 1863-1867.
Butt, S., & Phillips, J.G. (2008). Personality and self-reported mobile phone use. *Computers
        in Human Behavior, 24,* 346-360.
Byrne, R., & Findlay, B. (2004). Preference for SMS versus telephone calls in initiating
        romantic relationships. *Australian Journal of Emerging Technologies and Society, 2*,
        48-61.
Campos, B. (2006). A hitchhiker's guide to telepsychology. *InPsych,* December
        [downloaded 8th May from
        http://www.psychology.org.au/publication/inpsych/hitchhiker/]
Case, C.J., & Young, K.S. (2002). Employee internet management: Current business
        practices and outcomes. *CyberPsychology & Behavior, 5*(4), 355-361.
Caspi, A., & Gorsky, P. (2006). Online deception: prevalence, motivation, and emotion.
        CyberPsychology & Behavior, 9, 54-59.
Chau, A.W., & Phillips, J.G. (1995). Effects of perceived control upon wagering and
        attributions in computer Blackjack. *Journal of General Psychology, 122*(3), 253-269.
Comings, D.E. (1995). Tourette's syndrome: A behavioral spectrum disorder. In W.J.
        Weiner & A.E. Lang (eds.), *Behavioral Neurology of Movement Disorders* (pp. 293-
        303). New York: Raven Press.
Cornwell, B., & Lundgren, D.C. (2001). Love on the internet: involvement and
        misrepresentation in romantic relationships in cyberspace vs. realspace. *Computers in
        Human Behavior, 17,* 197-211.
Craig, C.R., & Stitzel, R.E. (1990). *Modern pharmacology* (ch. 41, Contemporary drug
        abuse). Boston: Little Brown & Company.
De Las Cuevas, C.; Arredondo, M. T.; Cabrera, M. F.; Sulzenbacher, H; Meise, U (2006):
        Randomized clinical trial of telepsychiatry through videoconference versus face-to-
        face conventional psychiatric treatment. *Telemedicine and E-Health, 12* (3), 341-350.
Eadington, W.R. (1998). Contributions of casino-style gambling to local economies. *The
        Annals of the American Academy of Political and Social Science, 556*, 53-65.

Eadington, W.R. (2004). The future of online gambling in the United States and elsewhere. *Journal of Public Policy & Marketing, 23*(2), 214-219.

(FaHCSIA, 2009). Review of current and future trends in Interactive gambling activity and regulation – Literature Review. Report commissioned by the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA). Retrieved 6 August 2009 from http://www.fahcsia.gov.au/sa/gamblingdrugs/pubs/review_trends/Documents/exec.htm

Finn, M. (2005). Gaming goes mobile: Issues and implications. *Australian Journal of Emerging Technologies and Society, 3*(1), 31-42.

Frank, M.L., & Smith, C. (1989). Illusion of control and gambling in children. *Journal of Gambling Behavior, 5*(2), 127-136.

Friedman, B., Kahn, P.H., & Howe, D.C. (2000). Trust online. *Communications of the ACM, 43,* 34-40.

Gibson, A., Miller, R., & King, R. (2007). Staying connected: Videoconferenced supervision for rural provisional psychologists. *InPsych*, October. [downloaded 8th May 2009 from http://www.psychology.org.au/publications/inpsych/video_supervision/]

Gibson, W.B. (1976). *The bunko book*. Las Vegas, Nevada: Gamblers Book Club.

Gilovich, T. (1983). Biased evaluation and persistence in gambling. *Journal of Personality and Social Psychology, 4*(6), 1110-1126.

Giovanni, L. & Oliviero, F. (2008). A new method for managing emergency calls. In A.C. Harper & R.V. Buress (Eds.), *Mobile telephones: Networks, applications, and performance* (pp. 231-240). New York: Nova Science.

Green, W.S., & Jordan, P.W. (Eds.). (2002). *Pleasure with products: Beyond usability*. USA: Routledge.

Greenfield, D. & Davis, R. (2002). Lost in cyberspace: the Web at work. *CyberPsychology and Behaviour, 5,* 347-353.

Griffiths, M. (1996). Gambling on the Internet: A brief note. *Journal of Gambling Studies, 12*, 471-473.

Griffiths, M. & Renwick, B. (2003). *Misfortune or mismanagement: A study of consumer debt issues*. Ourimbah, NSW: Central Coast School of Business, University of Newcastle.

Griffiths, K.M., Farrer, L., & Christensen, H. (2006). Effective treatments a click away. *InPsych,* December [downloaded 8th May from http://www.psychology.org.au/publications/inpsych/click/]

Gueguen, N. (2003). Help on the web: the effect of the same first name between the sender and the receptor in a request made by e-mail. *The Psychological Record, 53,* 459-466.

Hall, H.V., & Pritchard, D.A. (1996). *Detecting malingering and deception: Forensic Distortion Analysis*. Boston: St Lucie Press.

Hancock, J.T., Curry, L.E., Goorha, S., & Woodworth, M.T. (2004). Lies in conversation: an examination of deception using automated linguistic analysis. *Proceedings of the 26th annual conference of the cognitive science society.*

Hancock, J.T., Curry, L., Goorha, S., & Woodworth, M. (2005). Automated linguistic analysis of deceptive and truthful synchronous computer-mediated communication. *System Sciences, 2005. HICSS '05. Proceedings of the 38th Annual Hawaii International Conference,* 03-06 January, 2005.

Hargraves, D.M.G. & McCown, B.R.L. (2008). *Low-cost, low-bandwidth online meetings between farmers and scientists*. Proceedings of OZCHI2008, Cairns December 2008 [Available from ACM Digital Library http://portal.acm.org/dl.cfm]

Heinlen, K.T., Welfel, E.R., Richmond, E.N., O'Donnell, M.S. (2003a). The nature, scope, and ethics of psychologists' e-therapy web sites: what consumers find when surfing the web. *Psychotherapy: Theory, Research, Practice, Training, 40*; 112-124.

Heinlen, K.T., Welfel, E.R., Richmond, E.N., Rak, C.F (2003a). The scope of WebCounseling: a survey of services and compliance with NBCC Standards for the ethical practice of WebCounseling. *Journal of Counseling and Development, 81*; 61-69.

Henderson, M.A. (1985). *How con games work.* Secaucus, NJ: Citadel Press.

Higgins, R.L., & Snyder, C.R. (1989). Excuses gone awry: An analysis of self-defeating excuses. In R.C. Curtis (Eds.), *Self-defeating behaviors* (pp. 99-130). New York: Plenum Press.

Holden, C. (2001). "Behavioral addictions": Do they exist? *Science, 294*, 980-982.

Hollander, E. (1993) *Obsessive-compulsive related disorders*. Washington, DC: American Psychiatric Press

Holtgraves, T.M. (1988). Gambling as self-presentation. *Journal of Gambling Behavior, 4*(2), 78-91.

Houdin, R. (1904). *Card sharpers: Their tricks exposed or the art of always winning*. Chicago: F.J. Drake & Co. [Originally published in 1860s and translated from the French by W.J. Hilliar].

Hyler, S.E., Gangure, D.P. & Batchelder, S.T. (2005). Can telepsychiatry replace in-person psychiatric assessments? A review and meta-analysis of comparison studies. *CNS Spectrums*, *10*(5), 403-413.

(IIA, 2001). Internet Industry Association. Interactive Gambling Industry Code. Retrieved 6 August 2009 from http://www.acma.gov.au/webwr/aba/contentreg/codes/internet/documents/gamblingco de.pdf

Jones, R.M. (2006). Setting up a telepsychiatry service. *Psychiatric Bulletin*, *30*, 464-467.

Joukhador, J., Blaszczynski, A., & Maccallum, F. (2004). Superstitious beliefs in gambling among problem and non-problem gamblers: Preliminary data. *Journal of Gambling Studies, 20*(2), 171-180.

Kerr, N.L. (1983). Motivation losses in small groups: A social dilemma analysis. *Personality and Social Psychology, 45*, 819-828.

Kraut, R.E., Sunder, S., Telang, R., & Morris, J. (2005). Pricing electronic mail to solve the problem of spam. *Human Computer Interaction, 20*, 195-223.

Latane, D., & Darley, J.M. (1968). Group inhibition of bystander intervention in emergencies. *Journal of Personality and Social Psychology, 10,* 215-221.

Latane, D., & Darley, J.M. (1970). *The Unresponsive Bystander: why doesn't he help?* New York, NY: Appleton-Century Crofts.

Latane, D., & Nida, S. (1981). Ten years of research in group size and helping. *Psychological Bulletin, 89,* 308-324.

Lewis, C.E., Thompson, L.F., Wuensch, K.L., Grossnickle, W.F., & Cope, J.G. (2004). The impact of recipient list size and priority signs on electronic helping behavior. *Computers in Human Behavior, 20,* 633-644.

Lim, V.K.G. (2002). The IT way of loafing on the job: cyberloafing, neutralizing and organizational justice. *Journal of Organizational Behavior, 23,* 675-694.

Maheu, M.M. & Gordon, B.L. (2000). Counselling and therapy on the internet. *Professional Psychology: Research and Practice, 31*(5), 484-489.

Mallen, M.J., Vogel, D.L., Rochlen, A.B., & Day, S.X. (2005). Online counselling: Reviewing the literature from a counseling psychology framework. *The Counseling Psychologist, 33*, 819-870.

Markey, P.M (2000). Bystander intervention in computer-mediated communication. *Computers in Human Behavior, 16,* 183-188.

Markey, P.M., & Wells, S.M. (2002). Interpersonal perception in internet chat rooms. *Journal of Research in Personality, 36,* 134-146.

Maskelyne, J.N. (1894). *Sharps and Flats.* New York: Longmans Green & Co.

Media release, (2009). New National Broadband Network. Office of the Prime Minister of Australia. 7 April 2009. Retrieved 11 June, 2009 from http://www.pm.gov.au/media/Release/2009/media_release_0903.cfm

Midkiff, D.M., & Wyatt, W.J. (2008). Ethical issues in the provision of online mental health services (etherapy). *Journal of Technology in Human Services, 26*(2/4), 310-332.

Monaghan, S. (2009). Responsible gambling strategies for internet gambling" The theoretical and empirical base of using pop-up messages to encourage self-awareness. *Computers in Human Behavior, 25*, 202-207.

Monaghan, S., & Blaszczynski, A. (2009). Internet-based interventions for the treatment of problem gambling. Toronto: Centre for Addiction and Mental Health.

Merzer, M. (2009). New Internet gambling regulations go into effect. [downloaded 29th April from http://www.creditcards.com/credit-card-news/unlawful-internet-gambling-enforcement-act-credit-card-1282.php]

Nielsen, J. (2000). *Designing web usability.* Indianapolis: New Riders Publishing.

Norcross, J.C; Hedges, M; Prochaska, J. O (2002). The Face of 2010: A Delphi poll on the future of psychotherapy. *Professional Psychology: Research and Practice, 33* (3), 316–322.

Nuckles, M., & Ertelt, A. (2006). The problem of describing a problem: Supporting laypersons in presenting their queries to the internet-based helpdesk. *International Journal of Human-Computer Studies, 64,* 648-669.

O'Reilly, R; Bishop, J; Maddox, K; Hutchinson, L; Fisman,M & Takhar, J (2007) Is telepsychiatry equivalent to face-to-face psychiatry? Results from a randomized controlled equivalence trial. *Psychiatric Services, 58*(6), 836-843.

Phillips, J. G. & Amrhein, P. C. (1989). Factors influencing wagering in simulated Blackjack. *Journal of Gambling Behavior, 5*(2), 99-111.

Phillips, J.G., Butt, S., & Blaszczynski, A. (2006). Personality and self-reported use of mobile phones for games. *CyberPsychology & Behavior, 9*(6), 753-758.

Phillips, J. & Jory, M. (2009). *Technology adoption in education: Videoconferencing and audience participation.* Paper presented at "From social butterfly to urban citizen", HCSnet workshop, Kelvin Grove, July 13-14th, 2009. http://www.hcsnet.edu.au/files2/program_v2mf.pdf

Phillips, J.G., Jory, M., & Mogford, N. (2007). *Decisional style and eParticipation.* Proceedings of OZCHI2007, Adelaide, November 28th-30th. ACM Digital Library (http://portal.acm.org/dl.cfm)

Phillips, J.G., Jory, M.K., Wijenayake, L. & Hii, P. (2010). Lectures and information communication technology: Psychological factors influencing user acceptance and usability. In. A. Ragusa (Ed.), *Interaction in Communication Technologies & Virtual Learning Environments: Human Factors.* IGI Global.

Phillips, J.G. & Reddie, L. (2007). Decisional style and self-reported email use in the workplace. *Computers in Human Behavior, 23*, 2414-2428.

Phillips, J.G., Saling, L., & Blaszczynski, A. (2008). The psychology of mobile phone use and misuse. In A.C. Harper & R.V. Buress (Eds.), *Mobile Telephones: Networks, Applications, and Performance* (pp. 191-210). New York: Nova Science Publishers.

Phillips, J.G. & Stelmach, G.E. (1996). Parkinson's disease and other involuntary movement disorders of the basal ganglia. In C. Fredericks & L. Saladin (Ed.) *The motor system: basic principles and pathophysiology* (pp. 424-444). Philadelphia: F.A. Davis.

Pier, C., Klein, B., Austin, D., Mitchell, J., Kiropoulos, L, & Ryan, P. (2006). Reflections on internet therapy: Past, present and beyond. *InPsych,* December [downloaded 8th May from http://www.psychology.org.au/publications/inpsych/internet/]

Piezon, S.L., & Ferree, W.D. (2008). Perceptions of social loafing in online learning groups: A study of public university and U.S. Naval War College students. *International Review of Research in Open and Distance Learning, 9*(2), 1-17.

Pillavin, J.A., & Pillavin, I.M. (1972). Effects of blood on reactions to a victim. *Journal of Personality and Social Psychology, 23,* 353-361.

Poon, P., Hui, E., Dai, D., Kwok, T., & Woo, J. (2005): Cognitive intervention for community-dwelling older persons with memory problems: Telemedicine versus face-to-face treatment. *International Journal of Geriatric Psychiatry, 20*, 285–286.

Preece, J., Nonnecke, B., & Andrews, D. (2004). The top five reasons for lurking: Improving community experiences for everyone. *Computers in Human Behavior, 20,* 201-223.

Redish, A.D., Jensen, S., & Johnson, A. (2008). A unified framework for addiction: Vulnerabilities in the decision process. *Behavioral and Brain Sciences*, *31*(4), 415-437

Reid,D. & Reid, F. (2004). *Insights into the social and psychological effects of SMS text messaging* [downloaded 8th May2009 from http://www.160characters.org/documents/SocialEffectsOfTextMessaging.pdf]

Richardson, L.K; Frueh, B.C; Grubaugh, A.L; Johnson, R.H, Egede, L; Elhai, J.D. (2009): Current directions in videoconferencing tele-mental health research. *Clinical Psychology: Science and Practice, 16*(3), 323-338.

Rochlen, A.B., Zack, J.S., & Speyer, C. (2004). Online therapy: Review of relevant definitions, debates, and current empirical support. *Journal of Clinical Psychology, 60*(3), 269-283.

Rosecrance, J. (1986). Adapting to failure: The case of horse race gamblers. *Journal of Gambling Behavior, 2*(2), 81-94.

Rosecrance, J. (1986b). Attributions and the origins of problem gambling. *The Sociological Quarterly, 27*(4), 463-477.

Ruskin, P. E, Silver-Aylaian, M; Kling, M.A; Reed, S.A; Bradham, D. D, Hebel, J.R; Barrett, D; Knowles, F., & Hauser, P. (2004): Treatment outcomes in depression: comparison of remote treatment through telepsychiatry to in-person treatment. *American Journal of Psychiatry, 161*, 1471–1476.

Scealy, M., Phillips, J.G. & Stevenson, R. (2002). Shyness and anxiety as predictors of patterns of internet usage. *CyberPsychology & Behavior, 6*, 507-515.

Scoolidge, P.J. (2006). Gambling blindfolded: The case for a regulated domain for gambling sites. *Gaming Law Review, 10*(3), 252-265.

Sévigny, S., Cloutier, M., Pelletier, M-F., & Ladouceur, R. (2005). Internet gambling: Misleading payout rates during the "demo" period. Computers *in Human Behavior, 21*, 153-158.

Shaffer, H. J. (1996). Understanding the means and objects of addiction: Technology, the Internet and Gambling. *Journal of Gambling Studies, 12*, 461-469.

Shaffer, H.J., Hall, M.N., & Vander Bilt, J. (2000). Computer addiction: A critical consideration. *American Journal of Orthopsychiatry, 70(2),* 162-168.

Smeaton, M. & Griffiths, M.D. (2004). Internet gambling and social responsibility: An exploratory study, *CyberPsychology & Behavior*, 7, 49-57.

Smith, S.D., & Reynolds, C. (2002): Cyber-psychotherapy. *Annals of the American Psychotherapy Association*, March/April, 20-22.

Souza, A. (2006). Re-conceptualizing the mobile phone - from telephone to collective interfaces. *Australian Journal of Emerging Technologies and Society, 4*(2), 108-127.

Stein, D.J., Hollander, E., & Cohen, L. (1994). Neuropsychiatry of obsessive compulsive disorder. In E. Hollander, J. Zohar, D. Marazzati, & B. Olivier (Eds.), *Current insights in Obsessive Compulsive Disorder* (pp. 167-182). Chichester: John Wiley & Sons.

 Standard E.212 (ITU E.212) entitled "Land Mobile Numbering Plan".

Suler, J. (2004). The online disinhibition effect. *CyberPsychology & Behavior, 7(3),* 321-326.

Tanford, S., & Penrod, S. (1984). Social influence model: A formal integration of research on majority and minority influence processes. *Psychological Bulletin, 95,* 189-225.

Taylor, R.J. (2003). *Casino crimes and scams* (pp. 121-130). New York: Vantage Press.

Thomas, A., Allen, F., & Phillips, J.G. (2008). *EGM problem gambling: The importance of escape and accessibility as gambling motivators*. Paper presented at the 18th conference of the National Association for Gambling Studies, Adelaide, December 3rd-6th, 2008.

Toneatto, T. (1999). Cognitive psychopathology of problem gambling. *Substance Use & Misuse, 34(*11), 1593-1604.

Toneguzzo, S. J. (1996). Socially responsible introduction of gaming machine technology. In J. McMillen, M. Walker & S. Sturevska (Eds.), *Lady luck in Australia* (pp. 145-155). University of Sydney: University Printing Services.

Tractinsky, N., Katz, A.S., & Ikar, D. (2000). What is beautiful is usable. *Interacting with Computers, 13*, 127-145.

Urness D; Wass M; Gordon A; Tian E; Bulger T (2006): Client Acceptability and Quality of Life - Telepsychiatry compared to In-Person Consultation. *Journal of Telemedicine and Telecare, 12* (5), 251-254.

US Government Accounting Office (2002). Internet gambling: An overview of the issues. [downloaded 24th April 2009 from http://www.gao.gov/new.items/d0389.pdf]

Voelpel, S.C., Eckhoff, R.A., & Forster, J. (2008). David against Goliath? Group size and bystander effects in virtual knowledge sharing. *Human Relations, 61,* 271-295.

Yellowlees, P.M (2001). The future of Australasian psychiatrists: online or out of touch ? *Australian and New Zealand Journal of Psychiatry, 34*(4), 553-559.

Walker, M. B.(1989). Some problems with the concept of "Gambling Addiction": Should theories of addiction be generalized to include excessive gambling, *Journal of Gambling Behavior, 5(3),* 179-200.

Wajcman, J., Bittman, M., Jones, P., Johnstone, L.,& Brown, J. (2007). *The impact of the mobile phone on work/life balance*. ARC Linkage Project. [downloaded 20th May from http://polsc.anu.edu.au/staff/wajcman/pubs/Report_on_Mobiles_and_Work_Life_Balance_June_07.pdf].

Walker, M., Anjoul, F., & Milton, S. (2005). *A structured clinical interview for pathological gambling (SCIP)*. Paper presented at the 15th conference of the National Association for Gambling Studies, Alice Springs 10th-12th November.

Wang, H., Lee, M.K.O., & Wang, C. (1998). Consumer privacy concerns about internet marketing. *Communications of the ACM, 41*(3), 63-70.

Warden, N., Phillips, J.G., & Ogloff, J.R.P. (2004). Internet Addiction. *Psychiatry, Psychology and Law, 11(2),* 280-295.

Wei, R. (2008). The convergent mobile telephone: An emerging bridging medium. In A.C. Harper & R.V. Buress (Eds.), *Mobile telephones: Networks, applications and performance* (pp. 3-7). New York: Nova Science Publishers.

Weinberger, A. (1981). Responses to old people who ask for help. *Research on Aging, 3*, 345-368.

Weiner, B. (1986). *An attributional theory of motivation and emotion.* Springer Verlag: New York.

Whitty, M.T. (2002). Liar, liar! An examination of how open, supportive and honest people are in chat rooms. *Computers in Human Behavior, 18,* 343-352.

Whitty, M.T., & Carville, S.E. (2008). Would I lie to you? Self-serving lies and other-oriented lies told across different media. *Computers in Human Behavior, 24,* 1021-1031.

Wood, R.T., Williams, R.J., & Lawton, P.K. (2007). Why do internet gamblers prefer online versus land-based venues? Some preliminary findings and implications. *Journal of Gambling Issues, 20,* 235-252.

Young, K.S., & Case, C.J. (2004). Internet abuse in the workplace: New trends in risk management. *CyberPsychology & Behavior, 7*(1), 105-111.

7. Literature Review Conclusions

A variety of reasons have been proposed for the legalisation of gambling. Arguments associated with the legalisation of online gambling may invoke existing difficulties controlling internet gambling. Other arguments may invoke online gambling (i.e. internet) as an export, or as a substitute for some other import (e.g. mobile phone) or a cheaper more convenient form for the consumer (e.g. interactive television). If industry needs to respond to the new opportunities posed by emerging technologies, then regulators also need to respond or there will be a degree of instability in the market, and increased risk to the consumer.

There are indications that both excitement and social withdrawal can characterise those individuals engaging in greater use of technology. The legalisation of gambling on mobile phones is liable to heighten risk for users that crave excitement, but realistically mobile phones will serve as a device that bridges that period of time when people do not have access to a computer work station or a television. The legalisation of gambling on interactive television is liable to have a greater impact upon the socially isolated, but it remains to be seen whether people will gamble at home, or prefer to get out of the house. An issue for interactive television will be whether the likelihood of supervision by others will influence a person's gambling behaviour.

Technology exists to deliver gaming to mobile phones and interactive televisions, but fidelity of experience is potentially a function of the amount of traffic in the network. Network congestion can delay or block online gambling. When people are wagering upon races or sporting events, greater care needs to be taken when conveying the results of these events to maintain consumer confidence.

Irrespective of the actual willingness of individuals to act in a deceptive manner the majority of email (96%) is spam, hence the internet is currently predominantly deceptive in nature. Companies are seeking the same "advertising" functionality for mobile phones. As communications technology can bring conman and grifters directly to the person, the home and workplace, this is a factor that potentially erodes consumer confidence. Given that research indicates that people are less willing to assist people online, it seems that the online environment is more dangerous for consumers.

As it can be difficult to control the internet, attempts to block or limit online gambling need to target specific organisations involved in the process of online gambling. The very personal and ubiquitous nature of emerging computing capabilities means that gaming technology can be personalised and customised to the consumer and his or her location. Nevertheless, technology also exists to monitor consumers and advise them online as to the status of their account, the amount of time they have spent, and to warn them about erroneous cognitions. Online counselling is also available, whereas some other techniques of assisting individuals (e.g. discussion groups) are of dubious efficacy.

8. Survey

8.1 Survey - Introduction

The mobile phone is the device currently touted to bridge the digital divide. Indeed there are more mobile phones in Australia than people (ACMA, 2006-2007). As the mobile phone is a personalised communication device, it means that each consumer is potentially contactable 24 hours a day, 7 days a week. More important is the potential for consumers to interact with commercial companies. For instance, the provision of gambling upon mobile phones means that every consumer will soon have their own personalised gaming terminal (Griffiths, 2003; 2007). The same capability will, in the near future, occur with interactive television (Griffiths, 2007). Given the increasing potential for personalised interaction, the present survey seeks to address factors influencing consumer use of interactive services.

Wireless and cable technologies provide internet connectivity and hence interactivity through a variety of mobile and fixed devices such as mobile phones, laptop and desktop computers, personal digital assistants, games consoles, and even television. Internet-based interactivity provides users with the ability to participate in activities such as live chatting, multi-player games, e-commerce and the sharing of user-generated music/videos through sites such as YouTube.

Of all interactive devices mobile phones provide the greatest flexibility. Mobile phones allow direct connection to the internet, in addition to a capacity to communicate with others in a variety of formats: voice; audio and video as Multimedia Messaging Service (MMS); and text only as Short Message Service (SMS). SMS technology enables interactivity such as voting in reality TV shows, requesting jokes, quotes or trivia, obtaining a daily horoscope and even determining "love compatibility".

Although psychologists in the area of Ergonomics and Human Factors have assisted in the evaluation of the usability of interactive technologies, they have generally tended to overlook the reasons and motivations underpinning the use of such technologies. Some results have however emerged in the area of interactive television (iTV). Unlike conventional (non-interactive) TV, interactive TV is structured along a two-way transmission model requiring information flow both to and from the audience with user information transmitted to the television station through a "return path" usually involving internet technology via a dedicated device such as a set-top box.

Psychologically, it has been suggested that iTV appeals to different people for different reasons. For the anxious who may be predisposed to avoiding communication where possible (Beatty et al., 1991) iTV is thought to reduce "communication apprehension" (Gumpert & Drucker, 1992). For the impulsive, the appeal is thought to lay in its ability to satisfy their impulsivity/immediacy tendencies with iTV viewers reportedly using their TV to purchase merchandise, watch live streaming videos, quizzes with high value prizes or cash, tickets to live events and interactive DVD's with that trend common across all income brackets (Kingsford-Smith, 2003, September 5). Home-shoppers on the other hand are reportedly attracted to their programs for reasons including "salience" (shopping is of great interest to such people, Skumanich & Kintsfather, 1998) and because of the perceived positive relationship viewers have with the host and with other viewers (Grant, Guthrie & Ball-Rokeach, 1991). Such shows then could be particularly appealing to the lonely or the emotionally vulnerable.

The potential of iTV to exploit the impulsive and/or the lonely has not gone unnoticed. The British Parliament, through its House of Commons Culture, Media and Sport Select Committee on Call TV Quizshows, expressed concern that participation in such shows is compulsive for some viewers with one viewer reportedly having made 60 calls in an eight minute period (House of Commons Culture, Media and Sport Select Committee, 2007). They also noted the late night/early morning nature of the programs had the potential to exploit the lonely, tired or inebriated, a view that is reflected elsewhere in the literature (Griffiths, 2007).

The lack of understanding of issues that motivate people to use different interactive technologies has become increasingly important in the face of the emergence and widespread usage of technologies that support large-scale interactivity. We have previously considered self-reported problems limiting technology use as a predictor of internet use (Armstrong, Phillips, & Saling, 2000) and mobile phone use (Bianchi & Phillips, 2005). Given the emerging capability for technology to deliver interactive services directly to the consumer, the present study considers whether scales addressing problem technology use can predict gambling behaviour and the tendency to use interactive services. The study also addressed attitudes towards digital services, and the methods people might employ to resolve dispute.

8.2 Survey Methods

8.2.1 Participants

A survey on the use of technology for recreational purposes was conducted on the internet with people encouraged to enter for the chance to win one of ten iPods. At close of data collection (viz 5 pm 1st December 2008 AEST) 1141 people attempted the survey resulting in 1012 "complete" questionnaires. However the number of usable questionnaires actually varied as a function of blank or uninterpretable responses to certain questions. Demographic information was also collected, with 393 males and 509 females in the final sample with a mean age of 37.85 years (SD= 12.80).

8.2.2 Materials

8.2.2.1 Canadian Problem Gambling Index

People were classified in terms of their risk of developing a gambling problem using the nine-item Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (CPGI) (Ferris & Wynne, 2001). Although our interest was in technology and gambling, the questionnaire was broadly described as a study of consumer leisure. To deemphasise the focus upon gambling, the CPGI was actually administered at the end of the survey.

8.2.2.2 Problem Technology Use

Scales were developed to measure problem usage patterns associated with a variety of Information Communication Technologies (i.e. Internet, Mobile Phones, Landlines, Television and Radio). The scales were developed from a 20-item questionnaire used to measure problem internet use (Armstrong, Phillips, & Saling, 2002) and a 27-item questionnaire used to measure problem mobile phone use (Bianchi & Phillips, 2005). Although these scales initially drew items from scales promoting internet use as an addiction (Brenner, 1997), an item analysis (Phillips, Saling, & Blaszczynski, 2008) suggested that 5 specific items might be able to predict problems controlling the use of these technologies.

The general form of the questions may be seen in Table 8.1. The questions addressed: 1) diminished control; 2) salience; 3) problems; 4) mood enhancement; 5) escapism.

Table 8.1. General form of questions used to assess problem use of technology.

	Question
1	I find myself *using the technology* for longer periods of time than I intended.
2	I find it difficult to keep up to date with current affairs and sports, without *using the technology*.
3	I find myself *using the technology* when I should be doing other things and it causes problems.
4	The *technology* makes me feel better when I am feeling down.
5	I find myself *using the technology* as a way of escaping from daily stresses

On September 24th 2008, the items produced scales of adequate reliability on a sample of 207 participants. A Television Problem Use Scale (TVPUS) obtained an adequate reliability as measured by Cronbach's alpha of 0.771. The Radio Problem Use Scale (RPUS) obtained a good reliability as measured by Cronbach's alpha of 0.860. The Internet Problem Use Scale (IPUS) obtained a Cronbach's alpha of 0.854. The problem use scale for telephone landlines (LPUS) produced a Cronbach's alpha of 0.888 and the problem use scale for mobile phones (MPUS) produced a Cronbach's alpha of 0.906.

As a test of the validity of these scales, each Problem Use Scale was correlated with self-reported usage. Self-reported usage of these technologies were generally positively skewed: TV 1.17; Radio 2.46, Internet (workplace) 1.70; Internet (personal) 2.89; Landline (workplace) 2.89; Landline (personal) 9.44; Mobile (work) 4.03; Mobile (personal) 3.41. Applying log 10 transforms to the self-reported hours of usage (+1) reduced skews to more acceptable values. Correlations were performed between each Problem Use Scale and a measure of use.

There were significant correlations between a specific Problem Use Scale and self-reported use of that particular technology. There was a significant correlation between the *Television Problem Use Scale* and self-reported TV use (transformed) (r=0.228, n=188, p<.01). There was a significant correlation between the *Radio Problem Use Scale* and self-reported radio use (transformed) (r=0.517, n=182, p<.01). There was also a significant correlation between *Internet Problem Use Scale* and self-reported personal use of the internet (transformed) (r=0.483, n=178, p<.01). Self-reported personal landline use correlated significantly with the *Landline Problem Use Scale* (transformed) (r=0.503, n=176, p<.01). There was also a significant correlation between the *Mobile Problem Use Scale* and self-reported personal use of mobile phones (transformed) (r=0.486, n=179, p<.01). Discriminant validity was demonstrated by small or non-significant correlations between each specific Problem Use Scale and the self-reported use of <u>other</u> forms of technology.

The reliabilities for the final sample of 1012 participants as measured by Cronbach's alpha were as follows: Television Problem Use Scale 0.804; Radio Problem Use Scale 0.824; Internet Problem Use Scale 0.860; Landline Problem Use Scale 0.867; Mobile Phone Problem Use Scale 0.900. The reliabilities for these Problem Use Scales are all good. Note that reliability is partly a function of scale length. The high obtained reliabilities suggest that the core elements of problem use have been addressed when the previous scales have been reduced from 20+ items down to 5-items.

Correlations between Problem Use Scales and self-reported usage (transformed) for the final sample can be seen in Table 8.2. The correlations demonstrating the validity of these scales is bolded. Where there are correlations between a Problem Use Scale and the use of another technology, the correlations are typically much smaller.

Table 8.2. Relationships between problem technology use scales and self-reported hours per week using the technology (untransformed data).

	TV	Radio	Internet (Personal)	Landline (Personal)	Mobile (Personal)
TVPUS	**0.286**** **(n=1074)**	-0.012 (n=1055)	0.040 (n=1042)	0.044 (n=1028)	0.131** (n=1016)
RPUS	0.043 (n=1054)	**0.472**** **(n=1059)**	-0.017 (n=1042)	0.122** (n=1028)	0.072* (n=1016)
IPUS	-0.101** (n=1037)	-0.067* (n=1040)	**0.485**** **(n=1041)**	0.012 (n=1026)	0.116** (n=1014)
LPUS	0.004 (n=1021)	0.024 (n=1024)	0.011 (n=1024)	**0.465**** **(n=1025)**	0.078* (n=1012)
MPUS	-0.169** (n=1004)	-0.016 (n=1007)	0.100** (n=1007)	0.113** (n=1007)	**0.442**** **(n=1006)**

$*p<.05; **p<.01$

8.2.2.3 Technology Use Survey

To address the use of emerging technologies for gambling, or gambling-like activities, a number of questions were developed to measure the use of TV (Table 8.3), radio (Table 8.4), internet (Table 8.5), landlines (Table 8.6) and mobile phones (Table 8.7). For each form of gambling or gambling-like activity, participants were asked the amount of time they devoted to that activity in a typical week. For each technology participants were asked the amount of time they spent in recreation using the technology in a typical week. Specific questions were devoted to applications pertaining to interactivity and gambling.

Questions directed at Television usage examined viewing and wagering behaviour. Questions also considered viewing and voting for reality TV programs and home shopping programs as these programs are an analog of services that will potentially become available on interactive devices. Questions addressed late night prize shows and TV competitions because these programs may offer insights as to interest in gambling on interactive TV.

Table 8.3. Questions directed at Television usage.

Do you have cable TV (i.e. *Foxtel; Austar*)? (yes/no)
How many hours each week do you typically spend watching TV? (hours per week)
How many sport programs do you usually watch each week on TV? (number of programs per week)
How many sporting events do you usually bet on in a week? (times per week)
How many race programs do you usually watch in a week on TV (include horses, greyhounds and trotting)? (number of programs per week)
How many races do you bet on in a typical week (include horses, greyhounds and trotting)? (number of races per week)
How many reality TV programs (e.g. *Big Brother*, Survivor) do you watch per week in a typical week on TV? (Number of reality programs per week)
In a typical week how many times do you send in a vote for a reality TV program? (times per week)
How many home shopping programs do you watch in a typical week on TV? (number of programs per week)
In a typical week, how often do you purchase products advertised on the home shopping programs on TV? (times per week)
How often did you watch the late night prize shows in a typical week (e.g. *Quizmania*, *The Mint*, Up-Late Game Show, *Midnight Zoo*). (times per month)
How many times did you phone the late night prize shows in a typical week (e.g. *Quizmania*, *The Mint*, Up-Late Game Show, *Midnight Zoo*). (times per week)
In a typical week how often do you enter SMS competitions for cash prizes offered on the TV? (number of times per week)

Questions directed at Radio usage examined listening habits and wagering behaviour. Questions also addressed interest in radio competitions with specific questions related to the use of mobile phones to enter competitions.

Table 8.4. Questions directed at Radio usage.

How many hours a week do you usually spend listening to the Radio? (hours per week)
How many programs do you listen to in a typical week on the Radio? (number of programs per week)
How many sports programs do you listen to on the Radio in a typical week?
How often do you bet on the outcome of a sport in a typical week? (times per week)
How many races do you listen to on the Radio in a typical week (Include horses, greyhounds and trotting)? (races per week)
How often do you bet on the outcome of the races in a typical week (include horses, greyhounds and trotting)? (times per week)
How often do you phone in to a radio program to participate in a competition in a typical week? (times per week)
How often do you enter SMS competitions for cash prizes on the Radio in a typical week? (times per week)

A section of the questionnaire considered internet usage. Questions distinguished between work and recreational usage. Questions also considered whether the internet was used for financial transactions, with particular emphasis upon games and wagering.

Table 8.5. Questions examining internet usage.

How many hours in a typical week do you spend using the Internet for work/study related purposes? (times per week)
How many hours a week do you typically spend using the Internet for non-work related purposes? (times per week)
How many times in a typical week do you use the Internet to make purchases? (times per week)
In a typical month, how many times do you use the Internet to pay bills? (times per month)
How often do you use the Internet to buy Lotto tickets in a typical week? (times per week)
How often do you use the Internet to enter competitions for cash prizes in a typical week? (times per week)
How often do you use the Internet to place bets on races in a typical week? (times per week)
How often do you use the Internet to place bets on sports in a typical week? (times per week)
How often do you usually play multiplayer games on the Internet? (times per week)
How often do you typically play poker on the Internet? (times per week)

Questions also considered the use of the landline for work and recreational purposes, and addressed the use of the landline for commercial purposes such as paying bills, shopping and wagering.

Table 8.6. Questions addressing the use of landline telephones.

In a typical week how many hours do you spend using the telephone (landline) for work purposes? (hours per week)
In a typical week how many hours do you spend using the telephone (landline) for personal reasons? (hours per week)
How many times a month do you typically use the telephone (landline) to pay bills? (times per month)
How many times a week do you typically use the telephone (landline) to buy things? (times per week)
How many times a week do you typically use the telephone (landline) to place bets? (times per week)

Additional questions focussed upon the use of the mobile phone. Separate questions distinguished between work and recreational use. Questions also addressed the use of the mobile phone for the purposes of recreation, with specific questions addressing interactive services or calls made at premium rates. Premium rate SMS are used for financial transactions.

Table 8.7. Questions pertaining to mobile phone use.

How many minutes a week do you usually spend using your mobile phone for work purposes? (minutes per week)
In a typical week how many minutes a week do you spend using your mobile phone for personal purposes? (minutes per week)
In a typical week how many minutes a week do you spend using your mobile phone to play games? (minutes per week)
How often do you use your mobile phone to purchase items in a typical week (e.g. ringtones, wallpaper)? (times per week)
How often do you use your mobile phone to vote (register preferences) in a typical week? (times per week)
In a typical week, how often do you use SMS on your mobile phone to calculate things such as sexual compatibility or blood alcohol concentration? (times per week)
In a typical week how often do you use SMS on your mobile phone to enter competitions for cash prizes offered in magazines? (times per week)

A series of questions addressed the willingness to engage in electronic financial transactions (see Table 8.8). These questions used 6 point Likert scales assessing agreement with a number of statements. Some of these questions were combined to produce a scale addressing an interest in credit for commercial transactions.

Table 8.8. Questions addressing willingness to engage in electronic financial transactions.

I prefer to use cash for financial transactions.
I prefer to use EFTPOS for financial transactions.
I prefer to use a credit card for financial transactions.
I prefer to use internet cash (PayPal, B-Pay) for financial transactions .
I find I use the credit on my mobile phone for financial transactions.

Additional questions addressing committment to engage in electronic financial transactions, either in the form of credit, or in the form of subscriptions (see Table 8.9). These questions also used 6 point Likert scales assessing agreement with a number of statements. Some of the questions were combined to produce a scale addressing interest in access to digital services.

Table 8.9. Questions addressing commitment to electronic financial transactions

I like to use a prepaid mobile phone.
I like to belong to consumer loyalty programs (e.g. Flybuys, Frequent Flyer, Community Benefit, Casino Club etc.).
I like to subscribe to cable television networks (e.g. SkyChannel, *Foxtel* etc.).
I prefer to visit places (e.g. Hotels, Motels) that subscribe to cable television networks (e.g. SkyChannel, *Foxtel*, etc.).
I will only choose to stay in hotels with free Internet connections when I travel
I frequently use Internet cafes to go online on the Internet
We should all take up digital television as soon as possible.

There were a number of scales addressing availability of digital services (e.g. cable TV, internet access). Five scales addressing access to digital services were combined to produce a scale addressing interest in access to digital services. The scales combined may be seen in Table 8.10. The questions produced a scale addressing interest in access to digital technology that will be named Digital Access. The scale has a Cronbach's alpha of 0.668. Although this is not ideal psychometrically, such a value is adequate for research purposes. The correlation of each item with the Digital Access scale may also be seen in Table 8.10

under the heading "loading". The Digital Access scale correlates with the Internet Problem Use Scale (r=0.301, n=997, p<.001). There were small but significant positive correlations between an interest in digital access and self-reported work-related internet use (log transformed) (r=0.146, n=1003, p<.001) or non-work-related internet use (log transformed) (r=0.151, n=1006, p<.001). A person desiring digital access is more likely to report problems controlling their internet usage and their levels of internet use tend to be somewhat higher.

Table 8.10. Interest in Digital Access Scale.

	Question	Loading
	I like to subscribe to cable television networks (e.g. SkyChannel, *Foxtel* etc.).	0.617
	I prefer to visit places (e.g. Hotels, Motels) that subscribe to cable television networks (e.g. SkyChannel, *Foxtel*, etc.).	0.740
	I will only choose to stay in hotels with free Internet connections when I travel	0.715
	I frequently use Internet cafes to go online on the Internet	0.572
	We should all take up digital television as soon as possible.	0.636

A number of questions addressed participants' preferences with respect to financial transactions. Questions addressing credit, preference for cash, EFTPOS or prepaid were examined. The three questions in Table 8.11 were sufficiently highly correlated that they could generate a scale with a Cronbach's alpha of 0.605. The reliability of the scale could be described as adequate for research purposes. The scale addresses an interest in the use of credit for financial transactions. The scale provided low but significant correlations with the use of the internet (r=0.313, n=1010, p<.001) or landline (r=0.183, n=1011, p<.001) to pay bills.

Table 8.11. Interest in credit for financial transactions.

	Question	Loading
	I prefer to use a credit card for financial transactions.	0.806
	I (don't) prefer to use cash for financial transactions.	0.735
	I like to belong to consumer loyalty programs (e.g. Flybuys, Frequent Flyer, Community Benefit, Casino Club etc.).	0.703

A series of questions addressed participants' concern for their electronic privacy or attempts to protect themselves from scams and spam (see Table 8.12). These questions used 6 point Likert scales assessing the extent participants agreed with particular statements. As the number of items and their intercorrelations were low a scale could not be formed, but the questions on SMS mailing lists provided interesting data nonetheless.

Table 8.12. Questions addressing concern for electronic privacy.

How often do you check your computer for viruses, spyware etc.in a typical month? (times per month)
How much SPAM do you usually receive a day? (messages a day)
How regularly do you unsubscribe to an electronic mailing list in a typical week? (times per week)
How regularly are you contacted by some SMS mailing list in a typical week? (times per week)
How regularly do you unsubscribe to an SMS mailing list in a typical week? (times per week)
How often are you phoned by telemarketers in a typical week? (times per week)

Additional questions addressed dissatisfaction with current protective mechanisms (see Table 8.13). These questions also used 6 point Likert scales assessing the extent participants agreed with particular statements.

Table 8.13. Questions addressing dissatisfaction with electronic privacy measures.

I believe that complaints about telemarketers have no effect upon the numbers of unwanted phonecalls I receive.
I believe that unsubscribing to an electronic mailing list has no effect upon the amount of SPAM I receive.
I believe that unsubscribing to an SMS mailing list is of no use at all.

Questions addressing complaints or the act of unsubscribing were examined. The three questions in Table 8.14 were sufficiently highly correlated that they could generate a scale with a Cronbach's alpha of 0.715. The reliability of the scale could be described as adequate for research purposes. The scale appears to address a dissatisfaction with current measures that are in place to protect electronic privacy. The scale had low but significant correlations with the amounts of Spam received (log transformed) (r=0.195, n=1003, p<.001) the number of times people reported being contacted by telemarketers (log transformed) (r=0.288, n=1009, p<.001) and interest in digital services (r=0.121, n=998, p<.001).

Table 8.14. Scale addressing dissatisfaction with electronic privacy.

	Question	Loading
	I believe that complaints about telemarketers have no effect upon the numbers of unwanted phonecalls I receive.	0.740
	I believe that unsubscribing to an electronic mailing list has no effect upon the amount of SPAM I receive.	0.842
	I believe that unsubscribing to an SMS mailing list is of no use at all.	0.811

The mechanisms for resolving dispute were examined. Participants were asked in 6 separate questions who they would contact in the event they had a problem or were upset about the services or content received over: 1) the internet; 2) mobile phone; 3) radio; 4) television; 5) pay TV; or if they had a problem with their 6) gambling. For each of these questions participants were provided with several options: a) nobody (deal with the problem yourself), b) a friend, c) a member of your church, d) the service provider, e) relevant industry body, f) Government regulatory body, g) other.

Participants were then asked which government regulatory body they would contact if they had problems with services or content received over the internet, mobile phone, radio,

TV or pay TV? The acronyms of a number of relevant industry or government regulatory bodies were provided (ACCC, ACMA, ADMA, AMTA, ASTRA, FTV, IARBA, IIA, TIO), with provision for a "don't know" response.

8.2.2.4 Betting and Wagering (all forms)

A number of questions addressed people's tendency to watch or listen to sporting events and bet or wager using a variety of technologies (see Table 8.15). There tended to be correlations between the various types of betting and wagering over the differing media, but they were typically low. Inter-correlations were higher when considering a specific activity (e.g. sports betting *across* TV, Radio, Internet, 0.949, 0.984; 0.932), but lower when considering gambling *within* a specific entertainment media (e.g. sport vs races for TV 0.155; radio 0.214; internet 0.174). Correlations were weak or non existent for certain activities such as internet poker or purchasing lotto tickets over the internet. The strength of correlations may reflect the relative maturity or the number of possible methods whereby bets can be placed. Sports betting is comparatively new with opportunities primarily limited to the internet, and casinos. Betting on races is a well established activity with opportunities associated with Bookmakers, TAB, casinos and the internet.

There are low but significant correlations between all forms of betting and wagering and the risk of developing a gambling problem. Intercorrelations are lower for questions addressing Internet Poker, Lotto and Phone Betting. Although correlations are low, the best correlations between technology and problem gambling arise from the question on sports betting associated with radio use.

Table 8.15. Relationships between types of betting over different communication technologies.

	Sports Betting Radio	Sports Betting Internet	Race Betting TV	Race Betting Radio	Race Betting Internet	Phone Betting	Internet Poker	Purchasing Lotto Tickets Internet	Risk of Gambling Problem
Sports Betting TV	.949** 1049	.984** 1042	.155** 1067	.154** 1046	.192** 1041	.133** 1029	.003 1042	.095** 1040	.171** 897
Sports Betting Radio		.932** 1033	.211** 1032	.214** 1046	.315** 1032	.084** 1021	.006 1033	.061 1029	.188** 889
SportsBetting Internet			.076* 1024	.081** 1029	.174** 1042	.084** 1030	.007 1043	.127** 1039	.159** 896
Race Betting TV				.955** 1028	.358** 1024	.748** 1011	.024 1024	.034 1022	.173** 882
Race Betting Radio					.341** 1028	.775** 1017	.006 1029	.051 1025	.169** 886
Race Betting Internet						.037 1028	-.005 1042	.061* 1038	.101** 895
Phone Betting							-.001 1029	.010 1025	.098** 897
Internet Poker								.038 1039	.175** 896
Purchasing Lotto Tickets									.103** 892

*significant p<.05; **significant p<.01

8.2.2.5 Tracking Behaviour

Although the present study used survey methods, verbal reports may not accurately reflect the actual behaviour of consumers. This may be because consumers may lack insight (Nisbett & Wilson, 1977) or may not remember (Ericsson & Simon, 1980). Nevertheless, current technology actually allows consumer behaviours to be monitored. Customers may be tracked by consumer loyalty programs, or simple accounting during the electronic provision of services. Hence corporations offering electronic services can track and monitor the activities of their customers (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010). To draw attention to this potential when delivering electronic services, a behavioural index of participants' interests was obtained. Participants were asked what sort of information they would be interested in seeing at the next link. Further information was offered on: a) Regulatory bodies; b) Counselling services; c) Gambling; d) Nothing.

8.3 References

ACMA. (2006-2007). Australian Communications and Media Authority. Communications Report .

Armstrong, L., Phillips, J.G., & Saling, L.L. (2000). Potential determinants of heavier Internet usage. *International Journal of Human Computer Studies, 53*, 537-550.

Beatty, M.J., Dobos, J.A., Balfantz, G.L., & Kuwabara, A.Y. (1991). Communication apprehension, state anxiety and behavioural disruption: A Causal analysis. *Communication Quarterly, 39*, 48-57.

Bianchi, A., & Phillips, J.G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology & Behavior, 8*, 39-51.

Brenner, V. (1997). Psychology of computer use: XLVII. Parameters of Internet use, abuse and addiction: The first 90 days of the Internet usage survey. *Psychological Reports, 80*, 879-882.

Ericsson, K.A., & Simon, H.A. (1980). Verbal reports as data. *Psychological Review, 87*, 215-251.

Ferris, J., & Wynne, H. (2001). *The Canadian Problem Gambling Index: User Manual*. Canadian Centre on Substance Abuse. Available at: www.ccsa.ca

Grant, A.E; Guthrie, K.K & Ball-Rokeach, S.J. (1991). Television shopping: A media dependency perspective. *Communication Research, 18*, 773-798

Griffiths, M.D. (2003). Internet gambling: Issues, concerns and recommendations. *CyberPsychology & Behavior, 6*, 557-568.

Griffiths, M. (2007). Interactive television quizzes as gambling: A cause for concern? *Journal of Gambling Issues, 20*, 269-76.

Gumpert, G., & Drucker, S.J. (1992). From the agora to the electronic shopping mall. *Critical Studies in Mass Communication, 9*, 186-200.

House of Commons Culture, Media and Sport Select Committee (2007). Call TV Quizshows. 3rd Report. Printed 17 January 2007. Retrieved 3 October, 2008 from http://www.publications.parliament.uk/pa/cm200607/cmselect/cmcumeds/72/7202.htm

Kingsford-Smith, I. Value added television: Multi-device enhanced TV. (2003, September 5). Retrieved August 8, 2008 from http://www.broadcastpapers.com/whitepapers/IKSValueAddedTV.pdf?CFID=35329187&CFTOKEN=274ec3b688f44ad9-66CAF0E0-D576-AD99-7F416C4BED2143EF

Nisbett, R.E., & Wilson, T.D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84*, 231-259.

Ofcom. (2006). Participation TV: How should it be regulated ? Issues Paper. (2006). Available at: http://www.ofcom.org.uk/consult/condocs/participation/

Phillips, J.G., Saling, L., & Blaszczynski, A. (2008). The psychology of mobile phone use and misuse. In A.C. Harper & R.V. Buress (Eds.), *Mobile Telephones: Networks, Applications, and Performance* (pp. 191-210). New York, Nova Science Publishers.

Shaffer, H.J., Peller, A.J., LaPlante, D.A., Nelson, S.E., & LaBrie, R.A. (2010). Toward a paradigm shift in Internet gambling research: From opinion and self-report to actual behavior. *Addiction Research and Theory, 18*(3), 270-283.

Skumanich, S.A; & Kintsfather, D.P. (1998). Individual media dependency relations with television programming. A causal model reviewed and revised. *Communication Research, 25*, 200-221

9. Survey Sample Characteristics

9.1 Demographic Analysis

As can be seen in Table 9.1, people participated from all Australian states, the Australian Capital Territory and Northern Territory. Most participants were from Victoria or New South Wales and Australian Capital Territory, with lesser numbers from Queensland, South Australia, Tasmania, and Western Australia. One of the "other" responses was an immigrant that did not tell us which state she was currently living in. Although the survey was advertised in the Northern Territory, participation was low, but this probably reflects the relative proportion of Australia's population. Response rates are roughly proportional to the size of the population in each state or territory, with possibly more participants than might be expected from Victoria and Australian Capital Territory and possibly fewer participants than might be expected from New South Wales and Queensland. Table 9.1 lists participant numbers as a function of state and risk of developing a gambling problem as indicated by the CPGI.

Table 9.1. Participant problem gambling status on the CPGI for each State/Territory.

	Non-Problem	Low Risk	Moderate Risk	Problem Gambler	Total
ACT	59 (74.7%)	10 (12.7%)	8 (10.1%)	2 (2.5%)	79 (100%)
NSW	128 (61.0%)	39 (18.6%)	31 (14.8%)	12 (5.7%)	210 (100%)
NT	10 (90.9%)	1 (9.1%)	0 (0%)	0 (0%)	11 (100%)
QLD	105 (78.4%)	15 (11.2%)	10 (7.5%)	4 (3.0%)	134 (100%)
SA	35 (68.6%)	13 (25.5%)	3 (5.9%)	0 (0%)	51 (100%)
TAS	37 (78.7%)	7 (14.9%)	3 (6.4%)	0 (0%)	47 (100%)
VIC	202 (74.8%)	36 (13.3%)	24 (8.9%)	8 (3.0%)	270 (100%)
WA	75 (78.9%)	11 (11.6%)	7 (7.4%)	2 (2.1%)	95 (100%)
Other	2 (66.7%)	1 (33.3%)	0 (0%)	0 (0%)	3 (100%)
Total	653 (72.6%)	133 (14.8%)	86 (9.6%)	28 (3.1%)	900 (100%)

The risk of developing a gambling problem is somewhat higher than values reported for the general Australian community when using the CPGI http://www.aph.gov.au/SENATE/COMMITTEE/CLAC_CTTE/poker_machine_harm_reduct/submissions/sub07.pdf. However the levels of problem gambling are comparable with values reported for internet gamblers in Canada http://www.austgamingcouncil.org.au/images/pdf/eLibrary/19121.pdf.

Table 9.2 reports the number of participants of each gender. There was a relationship between gender and problem gambling status, as indicated by a significant chi square statistic (χ^2 (1df)=14.606, p<.002). Proportionally more men were at risk of developing gambling problems than women.

Table 9.2. Participant problem gambling status on the CPGI for each gender.

	Non-Problem	Low Risk	Moderate Risk	Problem Gambler	Total
Male	267 (67.9%)	61 (15.5%)	54 (13.7%)	11 (2.8%)	393 (100%)
Female	387 (76.0%)	72 (14.1%)	33 (6.5%)	17 (3.3%)	509 (100%)
Total	654 (72.5%)	133 (14.7%)	87 (9.6%)	28 (3.1%)	902 (100%)

There was a relationship between education and problem gambling status, as indicated by a significant chi square statistic (χ^2 (12df)=27.603, p<.01). As may be seen in Table 9.3, lower levels of education were associated with higher risk of developing gambling problems. This sample was better educated than the national norms. Approximately 50% have studied at University, whereas nationally around 18% have university educations. However this almost certainly reflects the sorts of people using the internet. Our previous studies have demonstrated greater use of technology by younger and better educated individuals (Matanda, Jenvey, & Phillips, 2004; Scealey, Phillips, & Stevenson, 2002).

Table 9.3. Education and problem gambling status as indicated by the CPGI.

	Non-Problem	Low Risk	Moderate Risk	Problem Gambler	Total
Secondary	150 (69.1%)	36 (16.6%)	26 (12.0%)	5 (2.3%)	217 (100%)
Technical College	101 (68.7%)	20 (13.6%)	19 (12.9%)	7 (4.8%)	147 (100%)
Business College	32 (65.3%)	3 (6.1%)	9 (18.4%)	5 (10.2%)	49 (100%)
Uni Undergrad	198 (75.3%)	43 (16.3%)	16 (6.1%)	6 (2.3%)	263 (100%)
Uni Postgrad	173 (76.5%)	31 (13.7%)	17 (7.5%)	5 (2.2%)	226 (100%)
Total	654 (72.5%)	133 (14.7%)	87 (9.6%)	28 (3.1%)	902 (100%)

Table 9.4 considers age and income as a function of problem gambling status as measured by the CPGI. Oneway independent measures ANOVA was performed with linear contrasts to determine whether groups varying in their risk of developing a gambling problem differed in their age or income. There was no difference in the ages of non-problem and those at risk of developing gambling problems (F(3,888)=0.341, p>.05). There were trends suggesting that there were differences in income as a function of problem gambling status. While the overall anova was not significant (F(3,846)=1.925, p=.124), a significant linear contrast indicated that income decreased for the groups with increased risk of gambling problems (F(1,846)=4.249, p=.04, η^2=0.005) (see Table 9.5).

Table 9.4. Mean age (SE in brackets) as a function of problem gambling status.

	N	Age
Non-Problem	647	38.02 (0.50)
Low Risk	131	36.86 (1.18)
Moderate Risk	86	38.20 (1.26)
Problem Gambler	28	37.39 (2.38)
Overall	892	37.85 (0.42)

Table 9.5. Mean income (SE in brackets) as a function of problem gambling status.

	N	Income ($K)
Non-Problem	619	52.33 (1.43)
Low Risk	123	51.74 (3.80)
Moderate Risk	81	47.79 (3.05)
Problem Gambler	27	36.84 (3.78)
Overall	850	50.77 (1.22)

There were some trends for there to be a relationship between marital status and problem gambling status. Chi square statistic approached significance (χ^2 (3df)=7.672, p=.053). The data may be seen in Table 9.6. There are trends suggesting that single individuals may potentially be at more at risk of developing gambling problems.

Table 9.6. Marital status and problem gambling status as indicated by the CPGI.

	Non-Problem	Low Risk	Moderate Risk	Problem Gambler	Total
Single	205 (67.4%)	50 (16.4%)	35 (11.5%)	14 (4.6%)	304 (100%)
Partnership	445 (75.2%)	83 (14.0%)	50 (8.4%)	14 (2.4%)	592 (100%)
Total	650 (72.5%)	133 (14.8%)	85 (9.5%)	29 (3.1%)	896 (100%)

There was an association between accomodation status and problem gambling status as indicated by a significant chi square statistic (χ^2 (12df)=31.35, p<.01). As may be seen in Table 9.7, more individuals who are "at risk" appear to be in "rental" or "other" forms of accomodation.

Table 9.7. Accomodation status and problem gambling status as indicated by the CPGI.

	Non-Problem	Low Risk	Moderate Risk	Problem Gambler	Total
Parent's Home	97 (75.2%)	21 (16.3%)	10 (7.8%)	1 (0.8%)	129 (100%)
Rental	149 (63.1%)	38 (16.1%)	32 (13.6%)	17 (7.2%)	236 (100%)
Mortgage	253 (76.2%)	48 (14.5%)	25 (7.5%)	6 (1.8%)	332 (100%)
Own House	140 (77.3%)	21 (11.6%)	16 (8.8%)	4 (2.2%)	181 (100%)
Other	14 (63.6%)	5 (22.7%)	3 (13.6%)	0 (0%)	22 (100%)
Total	653 (72.6%)	133 (14.8%)	86 (9.6%)	28 (3.1%)	900 (100%)

9.2 Participation Rates

The rates at which people reported participating in some traditional forms of gambling may be seen in Table 9.8. The estimates for wagering on races are appreciably lower than values (16.0-28.2%) reported across the states nationally, whereas the estimates for betting on sports are comparable to the rates of 4.2 to 8.0% reported nationally (http://austgamingcouncil.org.au/images/pdf/Fact_Sheets/agc_fs7gamblingpart.pdf). We do not perceive this to be an issue as our survey was primarily conducted to determine the amounts of "electronic action".

Table 9.8. Rates at which people participate in gambling activities.

Question	Context	Percentage	N/Total
How many races do you bet on in a typical week (include horses, greyhounds and trotting)?	Races (televised)	7.0	(74/1064)
How often do you bet on the outcome of the races in a typical week (include horses, greyhounds and trotting)?	Races (radio)	5.6	(59/1045)
How many sporting events do you usually bet on in a week?	Sport (televised)	9.1	(98/1082)
How often do you bet on the outcome of a sport in a typical week?	Sport (radio)	7.0	(73/1048)

Table 9.9 shows the proportion of gambling being conducted over the internet. National estimates of the percentage of people purchasing lotto tickets vary from 48.4 to 62% (http://austgamingcouncil.org.au/images/pdf/Fact_Sheets/agc_fs7gamblingpart.pdf). However, the proportion of individuals reporting purchasing lotto tickets over the internet is appreciably smaller at 5%. The proportions of people placing bets on sport over the internet is comparable with sports wagering in Table 9.8, whereas the proportions of people wagering

on races over the internet is lower than the rates in Table 9.8, and lower than the national participation rates. Wood and Williams (2009) reported roughly comparable rates of internet gambling (3.0%) and similar rates of poker playing (8.0%).

The rates at which people report participating in competitions may be seen in Table 9.10. In such situations people previously would have hazarded only their time, a postage stamp or a phone call to enter a competition. In addition, entry into the competition would have been voluntary. While many of these competitions involving mobile phones may charge a cheaper SMS rate to enter the competition (e.g. 55c), the funds transfer can sometimes be disguised. Many SMS competitions automatically send "entry blanks" as premium SMS at a much more expensive rate (e.g. $2-$5) for receipt. Indeed even the act of unsubscribing may cost an appreciable amount. This would appear to be an electronic form of entrapment (Walker, 1992). As the competition typically seems to require little skill, and the outcome is otherwise determined by a chance draw, the activity resembles a form of gambling on mobile phones. Similar systems (e.g. "*Head 2 Head Trivia*", or "*TV1 Trivia challenge*") may be seen in magazines or on cable TV. Hence there are potentially quite high rates of participation (29.5%) in activities that may resemble gambling on mobile phones.

Table 9.9. Percentage of population reporting using the internet to gamble.

Internet	Percentage	N/Total
Lotto	5.0	(52/1042)
Races	3.8	(40/1040)
Sport	4.3	(45/1041)
Poker	6.0	(62/1041)

Table 9.10. Percentages using technology to enter competitions.

Question	Competitions	Percentage	N/Total
How often do you use the Internet to enter competitions for cash prizes in a typical week?	Internet	49.4	(514/1040)
How often do you phone in to a radio program to participate in a competition in a typical week?	Radio	11.5	(120/1048)
How often do you enter SMS competitions for cash prizes on the Radio in a typical week?	Radio (SMS)	12.7	(134/1056)
In a typical week how often do you enter SMS competitions for cash prizes offered on the TV?	TV (SMS)	22.6	(243/1075)
In a typical week how often do you use SMS on your mobile phone to enter competitions for cash prizes offered in magazines?	SMS magazines	24.3	(246/1013)
In a typical week how often do you enter competitions for cash prizes that involve SMS that cost 55c or more a call?	SMS premium rate	29.5	(301/1020)

9.3 References

Matanda, M., Jenvey, V.B., & Phillips, J.G. (2004). Internet use in adulthood: loneliness, computer anxiety and education. *Behavior Change, 21*, 103-114.

Scealy, M., Phillips, J. G., & Stevenson, R. (2002). Shyness and anxiety as predictors of patterns of Internet usage. *Cyberpsychology & Behavior, 5*, 507-515.

Walker, M.B. (1992). *The Psychology of Gambling*. Oxford: Pergamon Press.

Wood, R.T. & Williams, R.J. (2009). Internet gambling: Prevalence, patterns, problems, and policy options. Final report prepared for the Ontario Problem Gambling Research Center; Guelph, Ontario.

Wood, R.T., Williams, R.J., & Lawton, P.K. (2007). Why do internet gamblers prefer online versus land-based venues? Some preliminary findings and implications. *Journal of Gambling Issues, 20*, 235-252.

10. Survey Results

10.1 Television Viewing

10.1.1 TV - Hours Viewed

Commitment to electronic media can be indicated by the amount of time devoted to that media. It is possible that problem gamblers might spend more time watching TV for opportunities to gamble. Nevertheless, participants at greater risk of developing a gambling problem did not have a greater commitment to TV as measured by self-reported hours per week spent watching TV ($F(3,890)=1.288$, $p>.05$, $\eta^2=.004$) (see Table 10.1). The amount of television viewed does not seem to be related to gambling.

Table 10.1. Mean self-reported hours spent watching TV per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Self-reported Hours Viewed
Non-Problem	649	14.14 (9.82)
Low Risk	131	15.42 (8.88)
Moderate Risk	86	15.96 (11.70)
Problem Gambler	28	15.02 (12.93)
Total	894	14.53 (10.00)

10.1.2 Cable TV

Commitment to TV could be indicated by subscription to cable TV (i.e. *Foxtel* or *Austar*). Data collection finished on December 1st 2008. At this time a number of Free TV cable options were not yet available (e.g. *TiVo*). In this sample 28.8% (312) of participants subscribed to cable TV (i.e. *Foxtel* or *Austar*) while 71.2% (771) did not. Subscription to cable TV might be seen as a financial commitment to gambling relevant information (e.g. SkyChannel). As may be seen in Table 10.2, there was no relationship between the risk of problem gambling as measured by the CPGI and subscription to cable TV (i.e. *Foxtel* or *Austar*) as indicated by a non-significant chi square statistic ($\chi^2(3df)=3.972$, $p>.05$). Although rates of cable TV ownership are somewhat higher for individuals that were at risk, any differences are liable to reflect chance processes.

Table 10.2. Problem gambling status as a predictor of cable TV subscription.

	Cable TV	No Cable TV	Total
Non-Problem	178 (68.7%)	470 (74.2%)	648 (72.6%)
Low Risk	46 (17.8%)	85 (13.4%)	131 (14.7%)
Moderate Risk	28 (10.8%)	57 (9.0%)	85 (9.5%)
Problem Gambler	7 (2.7%)	21 (3.3%)	28 (3.1%)
Total	259 (100%)	633 (100%)	892 (100%)

10.1.3 TV Sports Viewing and Wagering

Not all television programs afford an opportunity for gambling. The opportunity to bet on sporting programs is a relatively new phenomenon in Australia made available through Betfair or Sportsbet. Sporting programs advertise links to betting websites, hence the amounts of time spent watching sports on TV could be informative. Although the overall

amount of TV watched per week did not vary as a function of risk of developing problem gambling, it is possible that the sorts of programs watched might vary. Although sport programs now afford opportunities to gamble, there were no differences in the numbers of sport programs watched as a function of problem gambling status. There were trends suggesting a relationship between the number of sports programs watched and the risk of developing problem gambling as measured by the CPGI. The difference between numbers of sports programs watched approached significance $(F(3,888)=2.602, p=0.051, \eta^2=.009)$. As may be seen in Table 10.3 there was a significant linear component to the means as a function of problem gambling status indicating that as risk of developing a gambling problem increases the number of sports programs watched increases as well $(F(1,888)=6.815, p<.05, \eta^2=0.008)$, but the proportions of variance accounted for by these relationships were quite low.

Table 10.3. Mean self-reported number of sport programs watched per week on TV as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Sport Programs
Non-Problem	647	1.45 (2.73)
Low Risk	131	1.98 (2.81)
Moderate Risk	86	1.94 (2.07)
Problem Gambler	28	2.32 (3.20)
Total	892	1.60 (2.71)

The self-reported number of bets on sporting events offers an index of interest in gambling. The mean number of bets placed on sporting events may be seen in Table 10.4. The mean number of bets varied significantly with problem gambling status $(F(3,888)=15.611, p<.001, \eta^2=.050)$. A significant linear trend $(F(1,888)=26.930, p<.001, \eta^2=0.030)$ indicated that as risk of developing a gambling problem increased, the number of bets placed on sporting events increased.

Table 10.4. Mean self-reported number of bets placed on sports events per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Sport Event Bets
Non-Problem	648	0.08 (0.44)
Low Risk	131	0.31(1.09)
Moderate Risk	85	0.68 (1.32)
Problem Gambler	28	4.46 (18.85)
Total	892	0.31 (3.44)

10.1.4 TV Race Viewing and Wagering

Compared to sporting programs, the capability to place wagers on races has been around for much longer. A consideration of sport and races indirectly offers insights into issues such as availability, acceptability, and exposure. Problem gambling status could explain differences in the numbers of races watched per week on TV. There were significant differences in the amounts of races watched by participants at risk of developing gambling problems as measured by the CPGI $(F(3,882)=7.948, p<.001, \eta^2=.026)$. A significant linear trend indicated that with increasing risk as measured by the CPGI, there was an increase in number of races watched $(F(1,882)=22.831, p<.001, \eta^2=.026)$ (see Table 10.5).

Table 10.5. Mean self-reported numbers of races watched per week on TV as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Races
Non-Problem	643	0.09 (0.61)
Low Risk	129	0.36 (1.86)
Moderate Risk	86	0.47 (1.01)
Problem Gambler	28	0.61 (1.34)
Total	886	0.18 (0.97)

Within this sample a minority of individuals bet on races (7.0%), and this makes estimates of the amounts of wagering somewhat unstable (as indicated by SD that are greater than mean values). As may be seen in Table 10.6, there is however an appreciable relationship between the number of bets placed and problem gambling status ($F(3,873)=9.816$, $p<.001$, $\eta^2=.033$). A significant linear component ($F(1,873)=23.780$, $p<.001$, $\eta^2=0.027$) indicated that as the risk of developing problem gambling increased, people placed more bets.

Table 10.6. Mean self-reported numbers of bets placed on races per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Bets
Non-Problem	636	0.12 (0.74)
Low Risk	130	0.58 (2.91)
Moderate Risk	83	1.75 (7.64)
Problem Gambler	28	0.98 (2.31)
Total	877	0.37 (2.74)

The previous analyses considered financial commitment and wagering behaviour within the context of television viewing. Problem gambling status has more of an influence upon the viewing of races than upon the viewing of sports. Relationships were observed between problem gambling status and placing of bets on sports and races.

10.1.5 TV Prize Shows

Interactive wagering is under consideration, but not yet available on TV. Currently the opportunity for wagering is by way of a different medium (e.g. phone or internet). Nevertheless, the technology to allow interactive viewing and wagering will soon allow this capability (e.g. red button on *Foxtel*). A consideration of response to cash prize shows may offer insights to a possible market for interactive wagering on TV. Although not currently available, in 2006 there were a number of "late nite prize shows" on TV. These shows required potential contestants to phone in "live" to answer questions that were seemingly general knowledge, but in fact were "low skill" in nature. Such interactive TV competitions still exist, but in different forms (e.g. TV1's Trivia Challenge). In such competitions people wager their time and phone credit to enter a low skill competition for a cash prize. Hence such competitions could be seen as precursor and a test of the market for interactive TV wagering (see Fox8's Banzai at http://www.fox8.tv/competitions/banzai/).

As may be seen in Table 10.7, there was an appreciable relationship between problem gambling status and the self-reported number of times late night prize shows were watched. Groups with differing risk of problem gambling differed significantly in the number of times watched ($F(3,882)=18.824$, $p<.001$, $\eta^2=.060$). A significant linear trend indicated that as risk of problem gambling increased, the frequency of viewing increased as well ($F(1,882)=44.625$, $p<.001$, $\eta^2=0.048$). As such programs were shown after midnight on weeknights, the implication is that gamblers were more likely to be missing sleep and having problems discharging their responsibilities the next day.

Table 10.7. Mean self-reported numbers of times a late night prize show is watched per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Times Late Night Prize Show Watched
Non-Problem	645	0.12 (0.59)
Low Risk	129	0.38 (1.05)
Moderate Risk	84	0.36 (0.90)
Problem Gambler	28	1.14 (2.05)
Total	886	0.21 (0.81)

10.1.6 Reality TV Programs

Fully interactive TV is technically possible in the near future, but was not available at the time of this survey. Nevertheless its precursors exist in a variety of forms. CableTV such as *Foxtel* have their red button to solicit audience response and consumer purchase and had gambling activities (on the Games channel). Reality TV programs currently use responses on mobile phones using premium SMS to solicit voter response, whereas TV1 uses a Trivia Game to generate entries in a cash prize draw. Fox8's Banzai uses the red buttton on the remote control for a chance to win a games platform. A consideration of viewing and voting patterns in response to reality TV programs may offer insights into possible markets for interactive gambling on TV.

Some of these Reality TV programs involved prizes (e.g. *Big Brother*), and as the number of contestants in reality TV shows reduces from week to week, there was also some uncertainty as to outcomes that appears to interest problem gamblers. Viewing patterns varied as a function of problem gambling status. There were significant differences in the self-reported number of reality TV programs watched per week by participants at risk of developing gambling problems as measured by the CPGI ($F(3,889)=3.578$, $p=.014$, $\eta^2=.012$). A significant linear trend indicated that with increasing risk as measured by the CPGI, there was an increase in frequency of viewing of reality TV programs per week ($F(1,889)=6.855$, $p<.01$, $\eta^2=.008$) (see Table 10.8). As some reality TV programs offered prizes for voting, this may explain this relationship.

Table 10.8. Mean self-reported number of times a reality TV show is watched per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Times Reality TV Show Watched
Non-Problem	648	1.17 (1.62)
Low Risk	131	1.26 (1.65)
Moderate Risk	86	1.33 (1.92)
Problem Gambler	28	2.20 (2.03)
Total	893	1.23 (1.67)

Participants at risk of developing gambling problems as measured by the CPGI were more likely to vote for reality TV programs ($F(3,884)=11.606$, $p<.001$, $\eta^2=.038$). A significant linear trend indicated that with increasing risk as measured by the CPGI, there was an increase in frequency of voting for reality TV programs per week ($F(1,884)=31.358$, $p<.001$, $\eta^2=0.035$) (see Table 10.9). As some reality TV programs offered prizes for voting, this may explain this relationship.

Table 10.9. Mean self-reported number of times participants voted for reality TV shows per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Times Voted for Reality TV Shows per Week
Non-Problem	644	0.11 (0.56)
Low Risk	131	0.22 (0.67)
Moderate Risk	85	0.39 (1.32)
Problem Gambler	28	0.82 (1.56)
Total	888	0.18 (0.74)

10.1.7 TV Shopping Programs

Proponents of gambling technologies sometimes claim that they are seeking to capitalise upon impulse purchases. Hence a consideration of responses to home shopping programs on the TV are potentially of interest. A consideration of home shopping programs is of interest, because interactive TV will allow purchases with the press of a button. Home shopping TV networks (i.e. EXPO, TVSN) are already in place to capitalise on such technology. As the intent of such technology is to capitalise on impulsive behaviour, it is of interest to see whether viewing and purchasing varies as a function of problem gambling status.

Risk of problem gambling as measured by the CPGI influences viewing ($F(3,883)=11.904$, $p<.001$, $\eta^2=.039$) (see Table 10.10) and purchasing behaviour ($F(3,879)=18.727$, $p<.001$, $\eta^2=.060$) (see Table 10.11). Significant linear trends indicates that increasing risk of problem gambling is associated with increased viewing of home shopping programs ($F(1,883)=24.755$, $p<.001$, $\eta^2=0.027$), and increased number of purchases in response to home shopping advertising ($F(1,879)=34.195$, $p<.001$, $\eta^2=0.037$).

Table 10.10. Mean self-reported number of times per week participants watched home shopping programs as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Times Watched Home Shopping Programs per Week
Non-Problem	644	0.14 (0.58)
Low Risk	130	0.31 (1.00)
Moderate Risk	85	0.26 (0.66)
Problem Gambler	28	0.89 (1.34)
Total	887	0.20 (0.71)

Table 10.11. Mean self-reported number of times per week participants purchased products in response to home shopping programs as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Times Purchased Home Shopping Program Products per Week
Non-Problem	643	0.02 (0.26)
Low Risk	129	0.17 (1.10)
Moderate Risk	85	0.12 (0.48)
Problem Gambler	26	0.93 (2.28)
Total	883	0.08 (0.65)

Although problem gamblers appear to be interested in home shopping programs, perhaps the best indicator of future response to any introduction of interactive TV would be the current response to TV programs offering cash prizes if people SMS. As many of these competitions require messages to be sent at a premium SMS rate (i.e. 55c) there is some potential for a cash flow, and as some of the competitions are low skill, this scenario approximates interactive gaming on television.

There was only a trend for problem gambling status to influence the number of times participants entered SMS competitions offered on the TV ($F(3,883)=2.030$, $p=.108$, $\eta^2=.007$) (see Table 10.12). A significant linear trend suggested that groups with a greater risk of developing gambling problems entered more SMS competitions on the TV ($F(1,883)=5.376$, $p=.021$, $\eta^2=0.006$), but the effect sizes are low.

Table 10.12. Mean number of times per week participants reported entering SMS competitions for cash prizes offered on TV as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Times Entered SMS Competitions for TV Cash Prizes
Non-Problem	645	0.51 (2.15)
Low Risk	129	0.69 (1.52)
Moderate Risk	85	0.81 (2.48)
Problem Gambler	28	1.39 (2.15)
Total	887	0.60 (2.11)

10.2 Radio Listening

10.2.1 Radio - Hours Listened

The radio varies from the TV in that it does not require focal visual attention and thus can be listened to while engaging in other activities. Hence it is more acceptable to listen to the radio while working and driving. Even so, people tended to spend less time listening to the radio than watching TV.

It is possible that problem gamblers might spend more time listening to the radio for opportunities to gamble. Nevertheless, participants at greater risk of developing a gambling problem did not have a greater commitment to radio as measured by self-reported hours per week spent listening to the radio ($F(3,892)=0.425$, $p>.05$, $\eta^2=.001$) (see Table 10.13).

Table 10.13. Mean self-reported hours spent listening to the radio per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Self-reported Hours Listened
Non-Problem	650	9.57 (13.47)
Low Risk	132	10.16 (12.30)
Moderate Risk	86	10.81 (14.00)
Problem Gambler	28	8.00 (10.82)
Total	896	9.73 (13.27)

Nor do problem gamblers simply listen to more radio programs as might be expected if they switched from radio station to radio station (see Table 10.14). There was no difference between the groups in the number of programs listened to ($F(3,887)=1.460$, $p>.05$, $\eta^2=.005$). Any differences in the numbers of radio programs listened to were liable to be due to chance rather than problem gambling status.

Table 10.14. Mean self-reported number of programs listened to on the radio per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Radio Programs
Non-Problem	645	3.40 (4.74)
Low Risk	132	4.25 (6.77)
Moderate Risk	86	3.84 (3.99)
Problem Gambler	28	2.64 (2.42)
Total	891	3.55 (4.98)

10.2.2 Radio - Sports Listening Habits and Wagering

Not all radio programs afford an opportunity for gambling. The opportunity to bet on sporting programs is a relatively new phenomenon in Australia, made available through organisations such as SportsBet and Betfair. Sporting programs advertise links to betting websites, hence the amounts of time spent listening to sports on radio could be informative. It is possible that problem gamblers might spend more time listening to the radio for specific opportunities to gamble such as afforded by sports programs. Indeed, participants at greater risk of developing a gambling problem reported listening to more sports programs per week on the radio ($F(3,888)=9.283$, $p<.001$, $\eta^2=.030$). A significant linear contrast indicated that with increasing risk of developing a gambling problem, people listened to more sports programs ($F(1,888)=23.553$, $p<.001$, $\eta^2=.026$) (see Table 10.15).

Table 10.15. Mean self-reported hours spent listening to sports programs on the radio per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Sports Programs
Non-Problem	649	0.32 (0.88)
Low Risk	130	0.67 (1.41)
Moderate Risk	85	0.60 (1.10)
Problem Gambler	28	1.07 (1.56)
Total	892	0.42 (1.04)

The self-reported number of bets on sporting events offers an index of interest in gambling. Although problem gamblers do not seem to listen to more radio in general, there are indications they listen to specific radio programs for opportunities to bet. The mean numbers of bets placed on sporting events may be seen in Table 10.16. The mean number of bets varied significantly with problem gambling status ($F(3,880)=17.847$, $p<.001$, $\eta^2=.057$). A significant linear trend ($F(1,880)=32.049$, $p<.001$, $\eta^2=0.034$) indicated that as the risk of developing a gambling problem increased, the number of bets placed on sporting events increased.

Table 10.16. Mean self-reported number of bets placed on sports events per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Sport Event Bets
Non-Problem	643	0.06 (0.41)
Low Risk	130	0.18 (0.67)
Moderate Risk	83	0.89 (3.44)
Problem Gambler	28	4.91 (19.04)
Total	884	0.31 (3.62)

10.2.3 Radio - Races - Listening Habits and Wagering

Although sporting programs offer opportunities to bet, the capability to place wagers on races has been around for much longer. A consideration of sport and races indirectly offers insights into issues such as availability, acceptability, and exposure. Although problem gambling status does not influence the total amount of radio listened to, it influences the sorts of programs listened to. The data indicated that problem gamblers are more likely to listen to races on the radio. Problem gambling status could explain differences in the numbers of races listened to per week on the radio. There were significant differences in the amounts of races listened to by participants at risk of developing gambling problems as measured by the CPGI ($F(3,889)=10.098$, $p<.001$, $\eta^2=.033$). A significant linear trend indicated that with increasing risk as measured by the CPGI, there was an increase in number of races listened to ($F(1,889)=25.631$, $p<.001$, $\eta^2=.028$) (see Table 10.17).

Table 10.17. Mean self-reported number of races listened to on the radio per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Races
Non-Problem	650	0.06 (0.51)
Low Risk	130	0.15 (0.77)
Moderate Risk	85	1.20 (7.25)
Problem Gambler	28	2.13 (6.69)
Total	893	0.25 (2.61)

Within this sample a minority of individuals bet on races (5.6%), and this makes estimates of rates somewhat unstable (as indicated by SD that are greater than mean values). As may be seen in Table 10.18, there was a significant relationship between the number of bets placed and problem gambling status ($F(3,877)=9.728$, $p<.001$, $\eta^2=.032$). A significant linear component ($F(1,877)=22.628$, $p<.001$, $\eta^2=0.025$) indicated that as the risk of developing problem gambling increased, people placed more bets on races.

Table 10.18. Mean self-reported number of bets placed on races per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Bets
Non-Problem	641	0.07 (0.44)
Low Risk	129	0.40 (2.71)
Moderate Risk	83	1.66 (7.63)
Problem Gambler	28	0.91 (2.19)
Total	881	0.30 (2.65)

The previous sections considered participants patterns listening to radio, and whether they varied as function of problem gambling status. Overall radio listening behaviours do not seem to vary with problem gambling status, but program gamblers respond to radio programs when there is an opportunity to wager, whether it be sports or races.

10.2.4 Radio Competitions

Radio stations also promote a variety of competitions to encourage listening behaviour. SMS is increasingly being used as the method of entry, hence it is important to consider radio competitions. Participants were asked how often they phoned in to a radio program to participate in a competition. As may be seen in Table 10.19, there was a significant relationship between the number of radio competitions entered and problem gambling status ($F(3,877)=8.179$, $p<.001$, $\eta^2=.027$). A significant linear component ($F(1,877)=11.232$, $p<.001$, $\eta^2=0.012$) indicated that as the risk of developing problem gambling increased, people entered more radio competitions.

Table 10.19. Mean self-reported number of radio competitions entered per week as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Competitions
Non-Problem	639	0.14 (0.56)
Low Risk	129	0.20 (0.63)
Moderate Risk	85	0.15 (0.42)
Problem Gambler	28	0.72 (1.54)
Total	881	0.16 (0.62)

As the cost of a premium SMS potentially acts as a funds transfer, the use of SMS to enter competitions is of particular interest. Participants were asked how often they entered SMS competitions for cash prizes. Table 10.20 lists the average number of SMS competitions per week as a function of problem gambling status ($F(3,885)=7.597$, $p<.001$, $\eta^2=.025$). A significant linear component ($F(1,885)=21.469$, $p<.001$, $\eta^2=0.024$) indicated that as the risk of developing problem gambling increased, people entered more radio competitions using SMS.

Table 10.20. Mean self-reported number of radio competitions entered per week using SMS as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Competitions
Non-Problem	648	0.19 (0.76)
Low Risk	128	0.30 (1.02)
Moderate Risk	85	0.50 (1.35)
Problem Gambler	28	0.84 (1.18)
Total	889	0.25 (0.90)

10.3 Internet Use

Although some researchers such as Shaffer (1996) have suggested that anything that is exciting can be addictive, the internet is somewhat of a puzzle. Use of the internet is a sedentary activity, and as downloads can take time, the suggestion that the internet is exciting and thus addictive may not be appropriate. Other researchers such as Griffiths (1996) suggest that the internet is a tool offering access to the object of interest. The following analysis will determine rates of use of the internet, with specific consideration of applications that would be of interest to problem gamblers. In overview, the findings are as would be expected. Problem gamblers are interested in using the internet to place bets.

10.3.1 Internet use - Work/Study

Participants were asked how many hours they spent using the Internet for work/study related purposes in a typical week. On average people spent 12.91 hours per week on the internet for work purposes. The amount of time spent on the internet for work purposes did not significantly change as a function of problem gambling status ($F(3,891)=1.142$, $p>.05$, $\eta^2=0.004$). The self-reported amounts of time spent on the internet for work purposes may be seen in Table 10.21.

Table 10.21. Mean self-reported hours per week using the internet for work purposes as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Hours Using Internet for Work
Non-Problem	650	12.64 (14.22)
Low Risk	131	13.41 (13.96)
Moderate Risk	86	12.61 (12.33)
Problem Gambler	28	17.54 (17.98)
Total	895	12.91 (14.15)

10.3.2 Internet Use - Personal Use

Although use of the internet at work does not change with problem gambling status, gambling is more appropriately considered to be a personal use of the internet. Participants were asked to report the hours in a typical week they spend using the Internet for non-work related purposes. People reported using the internet for non-work related purposes 12.17 hours per week. The level of personal use did not vary significantly with problem gambling status ($F(3,892)=2.065$, $p>.05$, $\eta^2=0.007$). Nevertheless, there was a significant linear trend ($F(1,892)=5.497$, $p<.05$, $\eta^2=0.006$) that suggested that as risk of developing a gambling problem increased, so did personal internet usage. As may be seen in Table 10.22, problem gamblers reported using the internet 38% more than non-problem gamblers.

Table 10.22. Mean self-reported hours per week using the internet for non-work related purposes as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Hours Using Internet for Non-Work Related Purposes
Non-Problem	650	11.77 (10.29)
Low Risk	132	12.45 (12.68)
Moderate Risk	86	13.45 (10.40)
Problem Gambler	28	16.29 (15.27)
Total	896	12.17 (10.88)

10.3.3 Internet Use - Commercial Transactions

Although there were suggestions that problem gamblers were using the internet for personal purposes, the effects were marginal. Subsequent questions helped to identify how people were using the internet. Ecommerce is a major internet application. Hence people were asked the number of times they used the internet to make purchases in a typical week. On average people reported buying something over the internet 1.0 times a week. The purchasing rates varied significantly with problem gambling status ($F(3,892)=4.849$, $p<.01$, $\eta^2=0.016$). A significant linear trend ($F(1,892)=10.089$, $p<.01$, $\eta^2=0.011$) indicated that as risk of developing a gambling problem increased, people made more purchases over the internet (see Table 10.23).

Table 10.23. Mean self-reported hours per week using the internet to make purchases as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Hours Using Internet to Make Purchases
Non-Problem	651	0.92 (1.68)
Low Risk	132	1.03 (1.35)
Moderate Risk	85	1.18 (2.50)
Problem Gambler	28	2.18 (2.84)
Total	896	1.00 (1.79)

Another indicator of willingness to use the internet to make financial transactions, is the use of the internet to pay bills. People were asked how many times they used the internet to pay bills in a typical month. On average people use the internet 4.07 times a month to pay bills. These rates did not vary significantly as a function of problem gambling status $(F(3,890)=1.047, p>.05, \eta^2=0.004)$. Table 10.24 implies problem gamblers use the internet more to pay bills, but any difference between means could be attributed to chance as the effect is not significant $(F(1,890)=2.564, p>.05, \eta^2=0.003)$.

Table 10.24. Mean self-reported number of times using the internet to pay bills as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Times Using Internet to Pay Bills
Non-Problem	650	3.96 (4.91)
Low Risk	132	4.14 (4.37)
Moderate Risk	85	4.41 (4.76)
Problem Gambler	28	5.46 (5.20)
Total	894	4.07 (4.83)

10.3.4 Internet Use - Betting and Wagering

Although problem gamblers do not use the internet more for work purposes, there were indications that they use the internet more for personal reasons. They do not seem to use the internet appreciably more often to pay bills, but they do use the internet more often to make purchases. The following analyses consider the sorts of purchases problem gamblers are interested in.

People were asked how often in a typical week did they use the internet to purchase lotto tickets. At the time of the survey people rarely used the internet to purchase lotto tickets (mean = 0.08), buying less than one ticket every three months by this method on average. However the rate of purchasing lotto tickets over the internet does vary significantly with problem gambling status $(F(3,883)=4.261, p<.01, \eta^2=0.014)$, a significant linear trend indicates that with increasing risk of a gambling problem, people are more likely to use the internet to purchase lotto tickets $(F(1,883)=9.652, p<.01, \eta^2=0.011)$. Means may be seen in Table 10.25. Although purchasing a lotto ticket over the internet is still an infrequent event, problem gamblers are 6 times more likely to purchase a lotto ticket this way than non-problem gamblers.

Table 10.25. Mean self-reported times per week using the internet to purchase lotto tickets as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Using Internet to Purchase Lotto Tickets
Non-Problem	644	0.04 (0.27)
Low Risk	130	0.17 (1.03)
Moderate Risk	85	0.12 (0.36)
Problem Gambler	28	0.29 (1.01)
Total	887	0.08 (0.51)

Given the nature of the sampling procedure ("iPod" competition), it is of interest to determine the levels of interest in competitions. Participants were asked how often they used the Internet to enter competitions for cash prizes in a typical week. On the whole, the participants that were surveyed were interested in entering competitions for cash prizes, entering a competition 3.61 times per week (see Table 10.26). However the rates at which people entered competitions did not vary significantly with problem gambling status $(F(3,880)=0.086, p>.05, \eta^2=0.000)$. This is probably because some of the individuals that were at lower risk of developing a gambling problem reported entering competitions a 100 times a week. *Entering a competition does not make someone a gambler.*

Table 10.26. Mean self-reported times per week using the internet to enter competitions for cash prizes as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Using Internet to Enter Competitions
Non-Problem	644	3.64 (12.41)
Low Risk	129	3.69 (13.25)
Moderate Risk	83	3.04 (4.82)
Problem Gambler	28	4.16 (7.27)
Total	884	3.61 (11.89)

Although the rates at which people entered competitions did not vary significantly with problem gambling status, a competition only involves a nominal outlay in terms of time and internet connection, and thus is not gambling. A more specific question was asked about the amount of use of the internet to place bets on races in a typical week. As may be seen in Table 10.27, people rarely used the internet to place bets on races, engaging in this activity on average 0.20 times a week (i.e. less than once a month). The rate with which people used the internet to bet on races varied significantly with problem gambling status $(F(3,886)=3.542, p<.05, \eta^2=0.012)$. A significant linear trend $(F(3,886)=8.375, p<.01, \eta^2=0.009)$ indicates the rates of internet wagering increased with problem gambling status.

Table 10.27. Mean self-reported times per week using the internet to place bets on races as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Using Internet to Place Bets on Races
Non-Problem	645	0.11 (1.99)
Low Risk	131	0.15 (1.33)
Moderate Risk	86	0.56 (3.31)
Problem Gambler	28	1.25 (2.99)
Total	890	0.20 (2.12)

Unlike betting on races, betting on sports is a comparatively recent development, and has a lower participation rate within the population. People were asked how often they used the internet to place bets on sports in a typical week. On average people bet on sports about once a month (Mean=0.23) (see Table 10.28). However, this rate varies significantly with problem gambling status ($F(3,887)=16.145$, $p<.001$, $\eta^2=0.052$). A significant linear trend indicates that as risk of a gambling problem increases, the rate at which people place bets on sports increases ($F(1,887)=23.474$, $p<.001$, $\eta^2=0.025$). As may be seen in Table 10.28, problem gamblers place bets on sports using the internet 150 times more often than non-problem gamblers.

Table 10.28. Mean self-reported times per week using the internet to place bets on sports as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Using Internet to Place Bets on Sports
Non-Problem	647	0.03 (0.24)
Low Risk	130	0.15 (1.25)
Moderate Risk	86	0.42 (1.33)
Problem Gambler	28	4.52 (18.84)
Total	891	0.23 (3.44)

10.3.5 Internet Use - Network Games and Poker

Although the internet allows people access to websites, menus, and commercial activities, developments in collaborative technologies mean that people can also play games with each other. To address this issue we asked people how often they played multiplayer games on the internet in a typical week. As may be seen in Table 10.29, participants on average played multiplayer games less than once a week (0.48 times a week). However the rates at which these games are played varied significantly with problem gambling status ($F(3,889)=6.644$, $p<.001$, $\eta^2=0.022$). A significant linear trend indicated that problem gamblers were more likely to play multiplayer games ($F(1,889)=19.182$, $p<.001$, $\eta^2=0.021$).

Table 10.29. Mean self-reported times per week using the internet to play multiplayer games as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Using Internet to Play Multiplayer Games
Non-Problem	648	0.35 (1.54)
Low Risk	131	0.55 (1.69)
Moderate Risk	86	1.08 (2.90)
Problem Gambler	28	1.43 (3.99)
Total	893	0.48 (1.87)

In the present survey, problem gamblers have not been interested in an application unless there was "action" involved. Hence a far more important question is how often people are playing poker on the internet in a typical week. As may be seen in Table 10.30 on average people played poker about once a month (Mean=0.24), but the rates at which people played internet poker varied with problem gambling status ($F(1,887)=9.631$, $p<.001$, $\eta^2=0.032$). A significant linear trend ($F(1,887)=28.220$, $p<.001$, $\eta^2=0.031$) indicated problem gamblers were about 8 times more likely to play poker on the internet.

Table 10.30. Mean self-reported times per week using the internet to play poker as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Using Internet to Play Poker
Non-Problem	646	0.12 (0.82)
Low Risk	131	0.34 (1.62)
Moderate Risk	86	0.78 (2.32)
Problem Gambler	28	1.00 (3.77)
Total	891	0.24 (1.37)

10.4 Telephone Use (Landline)

10.4.1 Phone Use - Work Purposes

The primary use of a telephone is for purposes of communication, but a landline can also be used to engage in commercial transactions. Although an established method, when compared to the internet which can supply a menu, the opportunities to place bets are somewhat limited as one needs both a form guide and the number of a bookie.

Participants were asked how many hours they spent using the telephone (landline) for work purposes in a typical week? On average people spent 3.86 hours (SD=7.10) using the phone for work purposes. There were significant differences between the amounts of time spent on the landline by people at risk of developing a gambling problem as measured by the CPGI ($F(3,890)=3.030$, $p<.05$, $\eta^2=0.010$), but the effect size was low. Although there was a significant main effect, the linear trend was not significant ($F(1,890)=2.236$, $p>.05$, $\eta^2=0.002$) and this indicates that problem gambling status did not linearly increase likelihood of using a landline for work purposes (see Table 10.31). Instead there appeared to be a degree of bimodality in phone use, with low risk and problem gambler using their landline more than non-problem and moderate risk individuals.

Table 10.31. Mean self-reported hours per week using a landline for work purposes as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Hours Using Landline for Work
Non-Problem	649	3.54 (6.62)
Low Risk	132	5.44 (9.35)
Moderate Risk	85	3.47 (5.77)
Problem Gambler	28	5.16 (8.49)
Total	894	3.86 (7.10)

10.4.2 Phone Use - Personal Use

Participants were also asked how many hours they spent using the telephone (landline) for personal reasons in a typical week. On average participants spent 2.12 hours per week (SD=3.63) on the landline for personal purposes. Problem gambling status was associated with significant differences in the number of hours spent on the landline for personal purposes ($F(3,891)=8.053$, $p<.001$, $\eta^2= .026$). Although there was a significant linear trend ($F(1,891)=5.845$, $p=.016$, $\eta^2= .006$), there was again some indication of bimodality as those with lower and higher risk of developing a gambling problem used their landlines more for personal reasons than non-problem or moderate risk individuals (see Table 10.32).

Table 10.32. Mean self-reported hours per week using a landline for personal purposes as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Hours Using Landline Personally
Non-Problem	650	1.85 (2.29)
Low Risk	132	3.43 (7.32)
Moderate Risk	85	1.80 (2.80)
Problem Gambler	28	3.14 (3.79)
Total	895	2.12 (3.63)

10.4.3 Phone use - Commercial Transactions

Questions addressing the use of the landline to make purchases or pay bills address willingness to engage in financial transactions using a particular form of technology. Participants were asked how many times a month they typically used their telephone (landline) to pay bills. On average people used their landline 0.75 hours per month paying bills, but problem gambling status had no effect upon the amount of time spent using the landline to pay bills ($F(3,889)=1.018$, $p>.05$, $\eta^2=.003$) (see Table 10.33)

Table 10.33. Mean self-reported hours per week using a landline to pay bills as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Hours Paying Bills Using Landline
Non-Problem	649	0.74 (1.65)
Low Risk	131	0.95 (1.82)
Moderate Risk	85	0.59 (1.11)
Problem Gambler	28	0.59 (0.91)
Total	893	0.75 (1.62)

Another index of willingness to use technology to engage in financial transactions is the amount of time spent using a landline line to make purchases. Participants were also asked how many times a week they typically used the telephone (landline) to buy things. People used a landline on average 0.21 times a week to make purchases. Problem gambling status had no effect on the self-reported number of purchases made over the telephone ($F(3,889)=1.668$, $p>.05$, $\eta^2=0.006$) (see Table 10.34).

Table 10.34. Mean self-reported times per week using a landline to make purchases as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number Purchases Using Landline
Non-Problem	650	0.15 (0.90)
Low Risk	131	0.47 (3.51)
Moderate Risk	85	0.18 (0.76)
Problem Gambler	27	0.44 (0.80)
Total	893	0.21 (1.57)

The previous analysis offers some indication as to the rates at which people use their telephones for financial transactions. There was no indication that problem gambling status influenced willingness to make purchases or pay bills. However there are differences in the use of landlines when betting is considered. Participants were asked how many times a week they typically used the telephone (landline) to place bets. Placing bets on a landline is not a common behaviour overall, with a bet being placed on average 0.09 times per week. However there was a significant effect of problem gambling status on phone betting ($F(3,888)=3.944$, $p<.01$, $\eta^2=0.013$). A significant linear trend ($F(1,888)=7.608$, $p<.01$, $\eta^2=0.008$) indicated that people were more likely to place bets over the phone if they were at risk of developing a gambling problem (see Table 10.35).

Table 10.35. Mean self-reported number of bets per week placed using a landline as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number Bets Placed Using Landline
Non-Problem	650	0.00 (0.06)
Low Risk	129	0.03 (0.27)
Moderate Risk	85	0.78 (6.52)
Problem Gambler	28	0.36 (1.13)
Total	892	0.09 (2.03)

10.5 Mobile Phones

Compared with the telephone (landline), there are a greater variety of financial transactions that can occur using a mobile phone. Although small, the screen on the mobile phone provides consumers with a range of options. Transactions can occur by way of an account as per *TAB Mobi*. In addition, mobile phones can charge a variety of rates for the receipt or transmission of messages, such that some forms of messaging can be seen as a form of commercial transaction. For example, a variety of novelty items such as wallpapers, ringtones and games can be purchased by subscriptions that add to the total of the mobile phone bill. As future developments in the area of mGaming will be targetted at mobile phones, it is of interest to considered factors predisposing people to use a variety of mobile phone applications.

10.5.1 Mobile Phone Use - Work Purposes

Initial questions in the survey focussed upon the basic rates at which people used mobile phones. People were asked how many minutes a week they usually spent using their mobile phone for work purposes. On average people spent 38.26 minutes per week using their mobile phone for work purposes, but rates of usage did not vary significantly as a function of problem gambling status ($F(3,890)=0.879$, $p>.05$, $\eta^2=0.003$), and this may in part reflect the high levels of variability associated with this measure (see Table 10.36). Although people at risk of a gambling problem appeared in Table 10.36 to spend more time on their mobile phones for work purposes, the differences were not significant. Perhaps this is just as well, as a tendency to use the employer's mobile phone for gambling could be a problem.

Table 10.36. Mean self-reported minutes per week using a mobile phone for work purposes as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Minutes Using Mobile for Work
Non-Problem	650	35.22 (88.99)
Low Risk	132	46.19 (104.89)
Moderate Risk	84	46.02 (94.09)
Problem Gambler	28	48.18 (75.80)
Total	894	38.26 (91.60)

10.5.2 Mobile Phone Use - Personal Use

The survey also considered the use of mobile phone for personal purposes. Participants were asked how many minutes they spent using their mobile phone for personal purposes in a typical week. On average people spent 76.45 minutes a week on their mobile phone. The amount of time people spent on the mobile phone did not vary significantly with problem gambling status $F(3,890)=1.268$, $p>.05$, $\eta^2=0.004$). Nevertheless, a linear trend suggested that problem gamblers were spending more time on their phone for personal reasons $F(3,890)=3.445$, $p=.064$, $\eta^2=0.004$) (see Table 10.37).

Table 10.37. Mean self-reported minutes per week using a mobile phone for personal purposes as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Minutes Using Mobile for Personal Reasons
Non-Problem	649	70.94 (142.99)
Low Risk	131	88.55 (182.92)
Moderate Risk	86	88.51 (126.50)
Problem Gambler	28	110.50 (157.03)
Total	894	76.45 (148.56)

10.5.3 Mobile Phone Use - Entertainment

Although there were interesting trends, statistically problem gamblers do not use their mobile phones any more than other individuals, but perhaps this is because the survey was asking about work or personal uses, whereas other applications may be of more interest to gamblers. Hence the survey asked questions directed at games and commercial transactions. Participants were asked the number of minutes in a typical week they spent using their mobile phone to play games. On average participants spent 8.82 minutes per week playing games on their mobile phones. Problem gambling status significantly influenced the amounts of time people reported spending playing games on their mobile phones ($F(3,892)=7.118$, $p<.001$, $\eta^2=0.023$), indeed a significant linear trend implied that problem gamblers spent more time playing games ($F(1,892)=6.781$, $p<.01$, $\eta^2=0.007$). A consideration of Table 10.38 indicates that the effect was more bimodal in nature, with low risk and problem gamblers spending more time playing games on their mobile phones.

Table 10.38. Mean self-reported minutes per week using a mobile phone to play games as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Minutes Using Mobile to Play Games
Non-Problem	650	6.05 (24.84)
Low Risk	132	21.20 (75.85)
Moderate Risk	86	6.44 (17.57)
Problem Gambler	28	22.00 (59.93)
Total	896	8.82 (38.23)

Mobile phones can come with preloaded games, alternatively a selection of games can be downloaded on to mobile phones via subscription. A clearer indicator of willingness to engage in financial transaction on mobile phones is the purchase of items using the mobile phone. Participants were asked how often they used their mobile phone to purchase items in a typical week (e.g. ringtones, wallpaper). People rarely use their mobile phone to make purchases, making a purchase only 0.18 times a week. Nevertheless, there were differences in willingness to make purchases as a function of problem gambling status ($F(3,888)=8.705$, $p<.001$, $\eta^2=0.029$). Although there were again hints of bimodality in the data, a significant linear trend indicated that increasing risk of a gambling problem increased likelihood of making purchases with one's mobile phone ($F(3,888)=13.503$, $p<.001$, $\eta^2=0.015$). As may be seen in Table 10.39, individuals at risk of a gambling problem are 3 to 38 times more likely to use their mobile phone to make purchases.

Table 10.39. Mean self-reported number of time per week using a mobile phone for to make purchases as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Purchases per Week
Non-Problem	648	0.04 (0.24)
Low Risk	131	0.67 (4.58)
Moderate Risk	85	0.12 (0.63)
Problem Gambler	28	1.54 (4.19)
Total	892	0.18 (1.94)

10.5.4 Mobile Phone Use - Interactive Entertainment

Advocates of sports wagering have likened wagering to a person's support for a sporting team, hence it is of interest to consider the extent to which people will use their mobile phone to vote. Indeed, as voting preferences are registered at a premium SMS rate, voting can incur a greater financial transaction than would be incurred by ordinary messaging. Participants were asked how often they used their mobile phone to vote (register preferences) in a typical week. Despite the best efforts of reality TV programs, on average people vote less than once a week (0.28 times per week). Mobile phone voting varied significantly with problem gambling status $F(3,888)=4.551$, $p<.01$, $\eta^2=0.015$). A significant linear trend indicates that as the risk of developing a gambling problem increases, people are more likely to register votes using their mobile phone ($F(3,888)=12.521$, $p<.001$, $\eta^2=0.014$). As may be seen in Table 10.40, there is a 6 fold increase in voting tendency as one becomes a problem gambler. This effect is somewhat surprising until one realises that there is a tendency for some TV networks to offer prizes for voting behaviour.

Table 10.40. Mean self-reported number of votes per week using a mobile phone as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Votes per Week
Non-Problem	647	0.19 (1.49)
Low Risk	132	0.34 (1.11)
Moderate Risk	85	0.61 (2.55)
Problem Gambler	28	1.14 (2.34)
Total	892	0.28 (1.61)

At the time this survey was developed there were a number of commercials on the TV offering people a variety of propositions involving SMS. The most common service offered induces people to SMS their and a prospective partner's name to a phone number to check "compatibility". As the service appears to be numerological in nature, it would seem to be of dubious value to the consumer. In general, services of this nature involve SMS calculations. As people pay for these services at premium rates, and the service delivered can be of doubtful value, questions were asked about the use of SMS on mobile phones to calculate things such as sexual compatibility or blood alcohol concentration. On average people used their mobile phones for SMS calculations 0.06 times a week. Although this rate seems to be a small amount on average, the rate varies significantly with problem gambling status

$(F(3,884)=15.845, p<.001, \eta^2=0.051)$ A significant linear trend $(F(1,884)=33.246, p=.001, \eta^2=0.036)$ indicates that as risk of gambling problem increases, the likelihood of using SMS calculation services increases. As may be seen in Table 10.41, there is a 46 fold increase in use of SMS calculation services by problem gamblers. As the TV advertises for calculations of sexual compatibility, this finding appears puzzling until one realises that another application of such services is in offering "tips" on races and sporting events (e.g. http://www.smartgambler.com.au/).

Table 10.41. Mean self-reported number of uses of SMS calculation services per week using a mobile phone as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of SMS Calculations per Week
Non-Problem	644	0.02 (0.23)
Low Risk	130	0.04 (0.32)
Moderate Risk	86	0.20 (1.15)
Problem Gambler	28	0.71 (2.11)
Total	888	0.06 (0.57)

Apart from *TAB Mobi*, the closest thing we could discover that resembled gambling on mobile phones were low skill schemes that encouraged people to enter competitions for prize draws. Magazines offered a variety of schemes by members of the Direct Marketing Association that would send people SMS messages that could be expensive (costing more than 55c for receipt). These messages were "entrance forms" that upon completion (accurate or not) would be eligible for a prize draw. The cost of SMS messages to enter the competition varied from normal to premium SMS rate. Hence participants were asked how often they used SMS on their mobile phone to enter competitions for cash prizes offered in magazines in a typical week. On average participants entered a SMS magazine competition 1.14 times a week, this value may be higher than normal as the survey used an iPod competition advertised in newspapers to solicit participants. The rate with which people entered SMS competitions varied with problem gambling status $(F(3,885)=3.320, p=.019, \eta^2=0.011)$. There was a linear relationship between risk of problem gambling and the number of competitions entered per week $F(3,885)=8.579, p<.01, \eta^2=0.010)$. As may be seen in Table 10.42, problem gamblers were about 3.5 times more likely to use their mobile phone to enter a magazine competition.

Table 10.42. Mean self-reported number of magazine competitions entered using SMS as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of Magazine SMS Competitions Entered per Week
Non-Problem	644	0.92 (3.86)
Low Risk	131	1.05 (3.42)
Moderate Risk	86	2.20 (10.94)
Problem Gambler	28	3.25 (6.52)
Total	889	1.14 (5.05)

Messaging services on mobile phones are typically overpriced, as electrons are comparatively cheap once an infrastructure is in place. SMS that cost 55c or more per call were considered as a clear sign of funds transfer. Participants were asked how often they entered competitions for cash prizes that involve SMS that cost 55c or more a call in a typical week. On average this sample entered one competition per week that cost 55c or more per call. In Table 10.43, the rate at which people enter competitions as a function of problem gambling status can be seen. Although problem gamblers were over twice as likely to enter SMS competitions that cost 55c or more per call, these differences could simply be due to chance, as the effect of problem gambling status was not significant ($F(3,889)=0.708$, $p>.05$, $\eta^2=0.002$).

Table 10.43. Mean self-reported number of competitions entered using SMS that cost more than 55c a call, as a function of risk of problem gambling status as measured by the CPGI (SD in brackets).

	N	Number of SMS Competitions Entered Costing 55c or more per Week
Non-Problem	648	1.31 (8.81)
Low Risk	131	1.35 (4.88)
Moderate Risk	86	1.72 (5.92)
Problem Gambler	28	3.50 (6.76)
Total	893	1.42 (8.04)

10.6 Summary

The present data indicate that gamblers are primarily interested in gambling and activities associated with gambling rather than simply being individuals with a greater interest in entertainment. Gamblers do not spend more time overall watching TV, using the internet or listening to radio. Gamblers do however attend more to programs where the outcome is uncertain (e.g. sports, race, reality TV programs) and there may be prizes. For instance, home shopping programs appear to attract the interest of problem gamblers. There are also a variety of emergent technologies that appear to have stimulated the interest of gamblers. People at risk of a gambling problem are more likely to use technology to make purchases, or use mobile phone technology to vote. The technology appears to offer access to the activity of interest, allowing gamblers to place bets without visiting a TAB or a lotto agency. Other technologies may be assisting the gamblers by offering "tips" (SMS calculation).

10.7 References

Griffiths, M. (1996). Gambling on the Internet: A brief note. *Journal of Gambling Studies, 12,* 471-473.

Shaffer, H. J., (1996). Understanding the means and objects of addiction: Technology, the Internet and Gambling, *Journal of Gambling Studies, 12,* 461-469.

11. Survey Results - Interplay between Gambling and Technology

11.1 Gambling and Technology

The previous section identified interactive activities supplied by emergent technologies that may be of interest to problem gamblers. These technologies have the potential to dramatically increase access to gambling. In particular there is the potential for every web capable device to serve as an electronic gaming machine. Given the greater availability of these devices, the present section seeks to determine whether the technology will increase risk by putting gambling within reach of new populations. Previous studies (e.g. Armstrong, Phillips, & Saling, 2000; Bianchi & Phillips, 2005; Phillips, Butt, & Blaszczynski, 2006) have identified a section of the community that has problems controlling their use of technology. The present section considers whether interest in technology increases the likely risk of developing gambling problems.

Most of the data under consideration involves activities that are engaged in by a smaller proportion of the community. Those individuals that do engage in the activity may devote considerable effort to the activity. Hence the data are typically skewed and the extreme scores are of most definite interest. Even after log transforms most of the data remained skewed, hence ANOVA has been used instead of multiple regression. Anova tends to be robust, and a consideration of interaction terms indicates whether an interest in technology potentiates (or protects from developing) a gambling problem.

## 11.2 Interplay Between Gambling and Problem TV Use

Splitting people into low (0-9), medium (10-17) and high (18-25) on the TV Problem Use Scale puts 7 problem gamblers into low, 14 into medium, and 7 into the high TV problem groups. The degree of risk of a gambling problem can be classified by the CPGI into non-problem, low risk, moderate risk, and problem gambler. Based upon these classifications, it is then possible to examine whether there is an interplay between the risk of developing a gambling problem and other indicators of self control, such as the TV Problem Use Scale.

A 4x3 independent measures anova was used to consider any interplay between the risk of developing a gambling problem and the degree of problem use of the TV upon the self-reported amounts of sporting events wagered upon in a week.

Degree of risk as indicated by the CPGI significantly affected sports wagers $(F(3,877)=24.430, p<.001, \eta^2=0.077)$. There was also a significant effect of TV Problem Use $(F(2,877)=31.034, p<.001, \eta^2=0.066)$. A significant interaction indicates that the two factors influence each other effects $(F(6,877)=15.532, p<.001, \eta^2=0.096)$. A consideration of Figure 11.1 indicates that people that with a greater interest in television viewing are not wagering on sports. Those people who do NOT have problems with their TV viewing are those that are placing bets. Gambling researchers such as Rosecrance (1988) and Walker (1992) have observed that gambling occupies an inordinate amount of time for some gamblers. Indeed the DSM-IV criteria list preoccupation as a criteria for diagnosing a gambling problem. Based upon the data collected in this survey in December 2008, people who are currently using TV for their entertainment are not wagering.

Figure 11.1. Self-reported numbers of bets placed on sporting events per week.
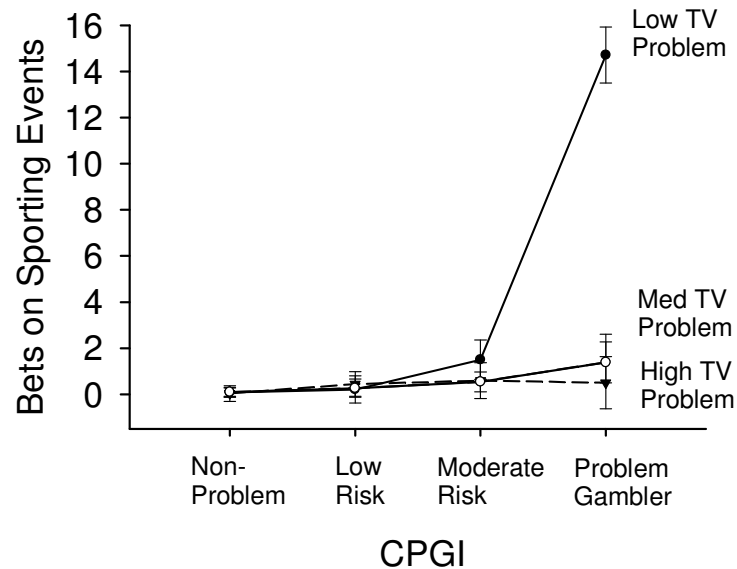
Problem gambling status significantly affected the self-reported numbers of races people bet on (F(3,862)=21.065, p<.001, η^2=0.068). There was also a significant effect of TV Problem Use (F(2,862)=14.054, p<.001, η^2=0.032). A significant interaction indicates that the two factors modified each other effects (F(6,862)=11.276, p<.001, η^2=0.073). A consideration of Figure 11.2 again indicates that it is people who do NOT have problems limiting their TV viewing that are placing bets.

Figure 11.2. Self-reported number of bets placed on races per week.
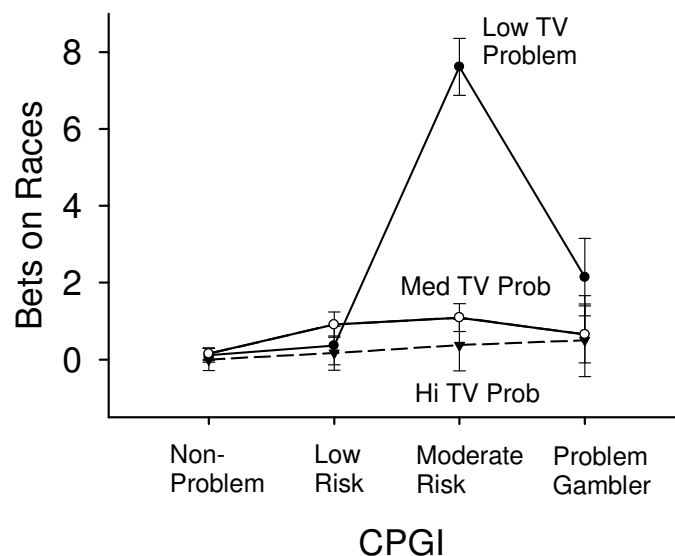
The previous analyses imply that if a person is not watching the TV, then they are not placing bets. It is therefore informative to consider instances where interaction is possible. With the advent of reality TV programs, TV has attained the capability to act as an arena in which people can vote for their favourites (or vote for non-favourites to be removed). As voting occurs at premium SMS rates there is some degree of financial transaction that is incurred, hence it is a behavioural precursor of other activities (e.g. wagering) that are forthcoming (i.e. interactive TV).

Participants were asked how many times they sent in a vote for a reality TV program (e.g. *Big Brother*, *Idol*) in a typical week. The independent measures anova indicated people that varied in their scores on the TV Problem Use Scale also varied in their tendency to vote for reality TV programs ($F(2,873)=7.335$, $p<.001$, $\eta^2=0.017$). Post Hoc tests suggested that people who had moderate and high scores on the TV Problem Use scale voted more than people with low scores on the TV Problem Use scale. Although a difficulty limiting one's TV viewing seems to prevent gambling, it does not stop voting behaviour. Given the previous findings it was surprising to find that problem gamblers were more likely to vote for reality TV programs ($F(3,873)=6.176$, $p<.001$, $\eta^2=0.021$). There was also a significant interaction between problem gambling status and problem TV viewing ($F(6,873)=3.584$, $p<.001$, $\eta^2=0.024$). The interaction may be seen in Figure 11.3. Greater gambling problems lead to a greater incidence of TV voting, but greater problems controlling TV viewing has a more U shaped influence upon TV voting, increasing viewing up to a point, and then decreasing voting. As voting behaviour is encouraged by the offering of prizes this may explain some of these findings, but it may be more informative to consider other forms of interactive service.

Figure 11.3. Self-reported frequency of voting for reality TV programs (times in a typical week).
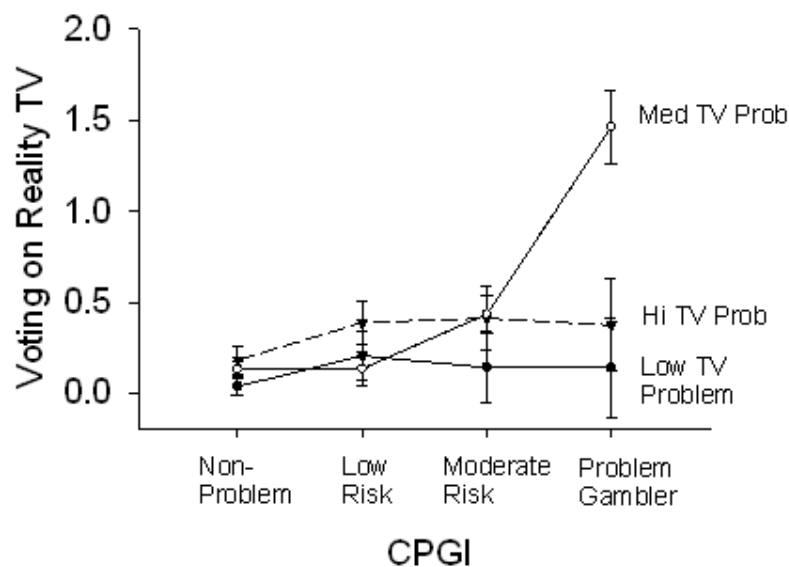
A consideration of people's willingness to purchase products advertised on TV home shopping programs may offer insights into people's willingness to purchase products on interactive TV. People with higher scores on the TV Problem Use scale were more likely to report buying products promoted on TV shopping programs ($F(2,868)=9.735$, $p<.001$, $\eta^2=0.022$). Although heavier TV use previously appeared to prevent gambling, problem gamblers were more likely purchase products promoted on TV shopping programs ($F(3,868)=14.237$, $p<.001$, $\eta^2=0.047$). There was also a significant interaction between

problem gambling status and problem TV viewing (F(6,868)=4.844, p<.001, η^2=0.032). The interaction may be seen in Figure 11.4. As home shopping programs emphasise expensive dreams or "value for low cost" and tend to emphasise the special or limited nature of the offer ("only 3 left"), these appear to be the sorts of stimuli that both problem gamblers and people who have problems controlling their TV viewing respond to. Hence there is some suggestion that people who cannot control their viewing may also be susceptible to developing a gambling problem, but it seems that these effects are specific to activities that resemble gambling.

Figure 11.4. Self-reported number of purchases from TV shopping programs in a typical week.
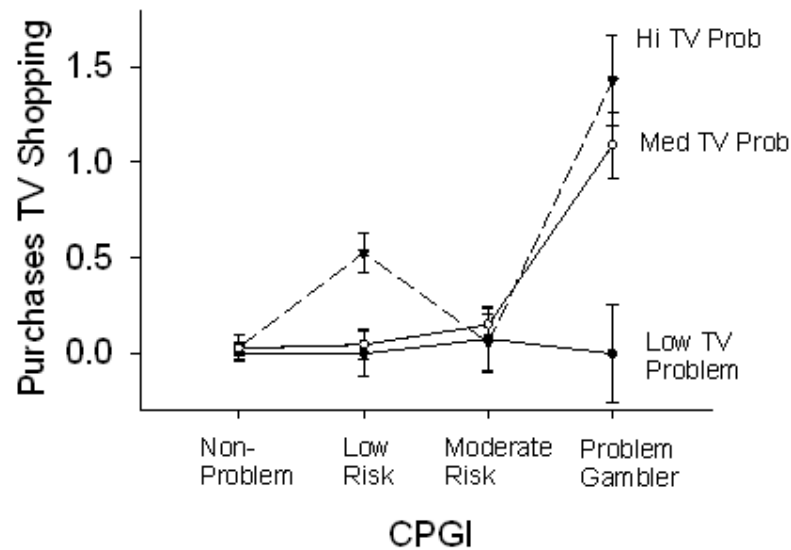

Other indicators of potential consumer response to gambling offered on interactive television would be interest in the late night prize shows that used to run on commercial television networks (e.g. *Quizmania*, *The Mint*, *Up Late Game Show*, *Midnight Zoo*). These shows encouraged viewers to phone in to answer questions that appeared to involve low levels of skill, or an element of chance, to have a chance of winning a cash prize. Such programs attracted the interest of people who have problems with their TV viewing, and problem gamblers. People who had problems controlling their TV viewing (F(2,871)=10.727, p<.001, η^2=.024) reported watching late night prize shows more often. People who were at risk of gambling problems also reported watching late night prize shows more often (F(3,871)=14.302, p<.001, η^2=.047). The significant interaction between TV problems and problem gambling status (F(6,871)=3.127, p<.01, η^2=.021) may be seen in Figure 11.5. Such a potentiation of effects implies that these programs are of interest to individuals that may have problems controlling their impulses.

Figure 11.5. Self-reported number of times spent watching late night prize shows per week.
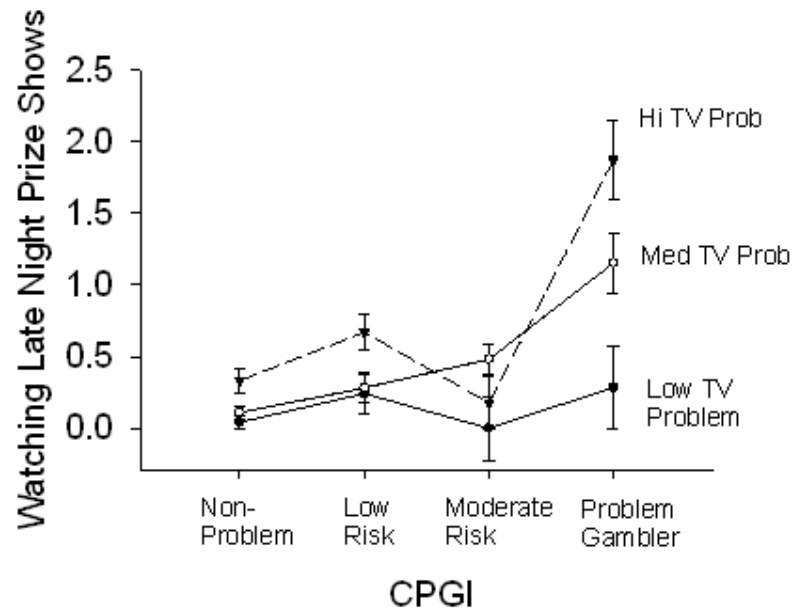
Perhaps the best indicator of interest in interactive gaming on TV is self-reported consumer response to SMS competitions for cash prizes offered on the TV. Both people controlling their TV viewing and problem gamblers are more likely to respond to such competitions. There was an effect of problem TV use upon the number of TV competitions offering cash prizes that participants reported entering into ($F(2,872)=3.314$, $p=0.037$, $\eta^2=0.008$). People who were high on the TV Problem Use Scale entered more competitions per week (M=1.34, SE=0.25) than people who had medium (M=0.88, SE=0.18) or low scores (M= 0.40, SE=0.27). The interaction between problem TV use and problem gambling status is not significant ($F(6,872)=0.742$, $p>.05$, $\eta^2=0.005$), nevertheless inspection of Figure 11.6 suggests that problem gamblers do not enter TV competitions for cash prizes unless they also have problems controlling their TV use.

Figure 11.6. Self-reported number of times per week sending SMS for cash prizes offered on the TV.
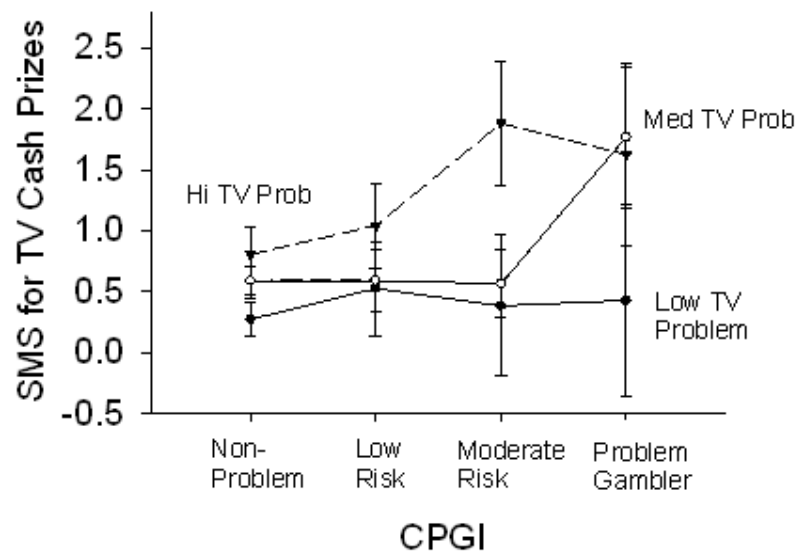
At the time this survey was conducted (December 2008), it would appear that serious television viewers were not placing bets. Such observations fit into Rosecrance's (1988) position that problem gamblers work long hours, or Walker's (1992) comments about "golf widows". Problem gamblers do not have the time to dedicate to TV viewing. Nevertheless, there are some activities that attract the interest of problem gamblers and people who have problems controlling their TV viewing.

11.3 Interplay Between Gambling and Problem Radio Use

The degree of risk of developing a gambling problem can be classified by the CPGI into non-problem, low risk, moderate risk, and problem gambler. Participants could also be split into two groups on the basis of their self-reported problems controlling their Radio listening. Splitting people into no problem (0-9), and problem (10-25) on the Radio Problem Use Scale put 11 problem gamblers into the group with no problem with their radio use, and 17 problem gamblers into the group with problems with their radio use. [Splitting people at 0-9, 10-17, and 18-25 would put only 3 problem gamblers into a group with high scores on the Radio Problem Use Scale.]   Based upon these classifications, it is then possible to examine whether there is an interplay between the risk of developing a gambling problem and other indicators of self control, such as the Radio Problem Use Scale.

A 4x2 independent measures anova was used to consider any interplay between the risk of developing a gambling problem and the degree of problem use of the radio upon the self-reported amounts of sporting events wagered upon in a week. Participants that reported more problems controlling their radio listening (M=0.43, SE=0.28) reported betting significantly *less* on sports than participants that had no problems controlling their use of the radio (M=3.16, SE=0.31) ($F(1,871)=42.897$, $p<.001$, $\eta^2=.047$). People who have problems controlling the time spent listening to the radio are not placing bets on sports. As expected there was a significant effect of problem gambling status upon the number of sports bets placed per week ($F(3,871)=26.405$, $p<.001$, $\eta^2=.083$). On average non-problem gamblers

reported placing bets on sports 0.64 times a week whereas problem gamblers reported placing bets on sports 6.00 times a week. A significant interaction between problem gambling status and problem radio use F(3,871)=19.276, p<.001, η^2=.062) suggests that people who had *less* problem controlling their radio listening were more likely to place sports bets (see Figure 11.7).

Figure 11.7. Self-reported numbers of bets on sports per week.
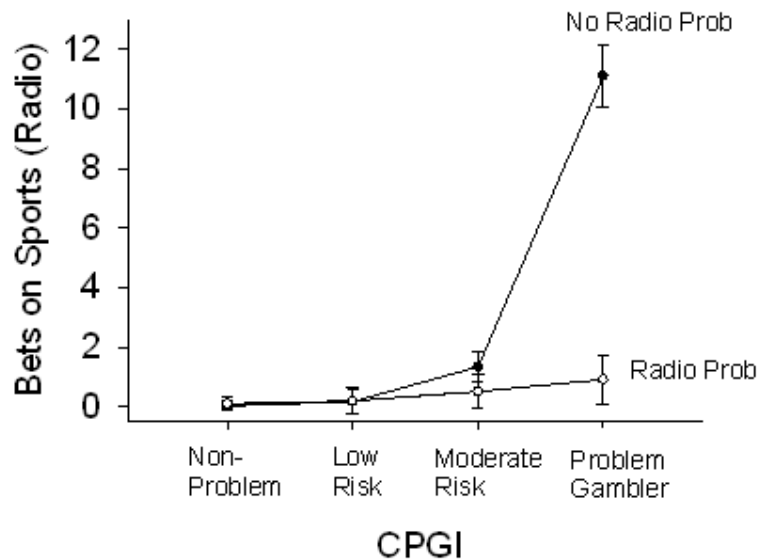
In the previous analysis, people who had poorer control of their radio listening actually reported betting less on sport. It is interesting to consider whether this also applies to bets place on races. A 2x4 independent measures anova considered self-reported number of bets placed per week on races.

Problems controlling radio listening had no effect upon the numbers of races that people reported wagering upon (F(1,868)=0.302, p>.05, η^2=.00), but as expected, a greater risk of a gambling problem significantly influenced the number of races wagered upon (F(1,868)=12.145, p<.001, η^2=.040). There was a significant interaction between control over radio listening and problem gambling status (F(3,868)=3.233, p=.022, η^2=.011). The interaction may be seen in Figure 11.8. A problem limiting radio listening can increase the levels of wagering for people at moderate risk of developing gambling problems.

Figure 11.8. Self-reported number of bets on races per week.
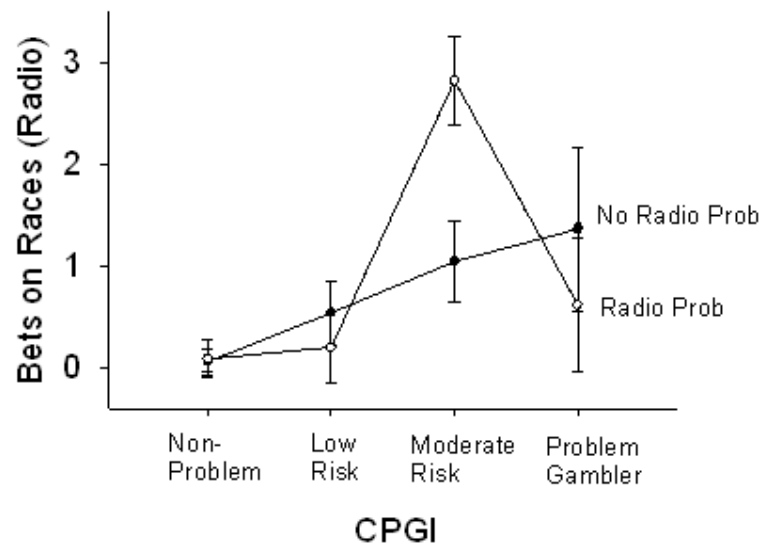
The relationship between radio listening and gambling is complex. It seems that the radio can distract attention away from sports wagering, but can serve to increase wagering for a subset of gamblers. Unlike anticipated developments in interactive TV and mobile gaming, radio is a mature technology that does not offer the sorts of interactivity available to newer technologies. Nevertheless, with the use of mobile phones a degree of interactivity is possible with the radio. Hence the survey asked questions concerning radio competitions, and cash prize competitions that could be entered using SMS.

In overview, it appears that people with an interest in radio and that have a gambling problem are more likely to enter radio competitions. People with a problem controlling their radio use (M=0.46, SE=.05) were significantly more likely to report entering radio competitions (F(1,869)=22.834, p<.001, η^2=.026) than people who did not have a problem controlling their radio use (M=0.11, SE=0.05). The likelihood of reporting entering radio competitions varied significantly with problem gambling status (F(3,869)=5.137, p<.01, η^2=.017). A problem gambler (M=0.62, SE=0.12) was 6 times more likely to enter a radio competition than a non-problem gambler (M= 0.16, SE=0.03). A significant interaction (F(3,869)=3.397, p=.017, η^2=.012) may be seen in Figure 11.9. It indicates that the likelihood of entering competitions increases if a person was a problem gambler and had problems controlling their radio use.

Figure 11.9. Self-reported number of radio competitions entered per week.
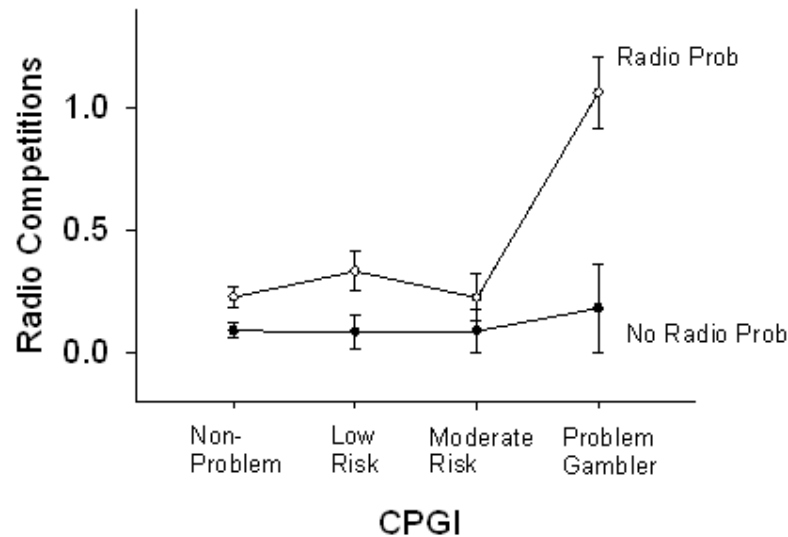
SMS at a premium rate are potentially means of transferring funds, hence the use of SMS to enter competitions for cash prizes are of particular interest. It is a person that reports problems controlling their radio listening and who is a problem gambler that is more likely to enter SMS competitions on the radio for cash prizes. People with problems controlling their radio use (M=0.76, SE=0.07) report sending SMS significantly more often for radio competitions offering cash prizes (F(1,877)=36.897, p<.001, η^2=.040) than people who do not have problems controlling their radio use (M=0.12, SE=0.08). There was a significant effect of problem gambling status (F(3,877)=5.752, p<.001, η^2=.019). Problem gamblers (M=0.71, SE=0.17) reported using SMS to enter radio competitions for cash prizes over 3 times more often than non-problem gamblers (M=0.21, SE=0.04). A significant interaction F(3,877)=7.154, p<.001, η^2=.024) may be seen in Figure 11.10. People with problems with their radio listening and who are at risk for developing gambling problems are more likely to enter SMS competitions for cash prizes on the radio.

Figure 11.10. Number of times per week participants reported entering SMS competitions on the radio for cash prizes.
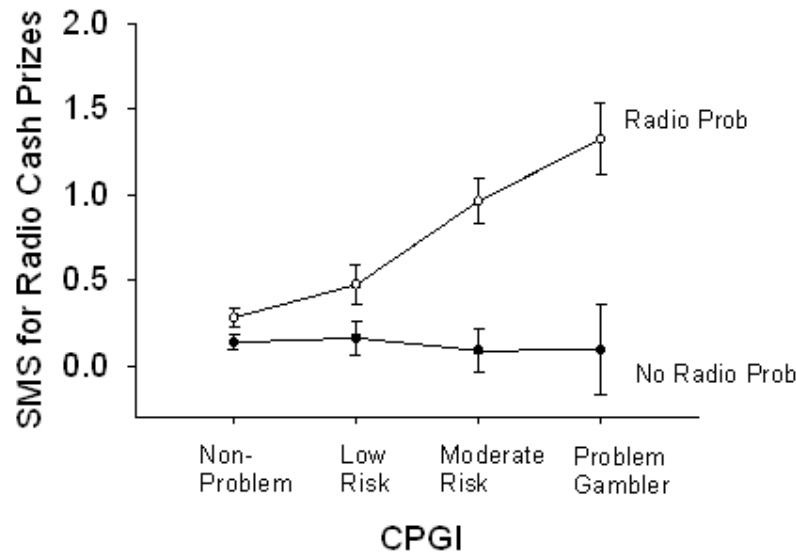
11.4 Interplay Between Gambling and Problem Internet Use

As before, the degree of risk of a gambling problem has been classified by the CPGI into non-problem, low risk, moderate risk, and problem gambler. Splitting people into low (0-9), medium (10-17) and high (18-25) on the Internet Problem Use Scale puts 6 problem gamblers into low, 12 into medium, and 10 into the high internet problem groups.   Based upon these classifications, it is then possible to examine whether there is an interplay between the risk of developing a gambling problem and other indicators of self control, such as the Internet Problem Use Scale.

As we are interested in the effect of technology upon gambling behaviour, an analysis of the use of the internet to place bets will be informative. The opportunity to place bets on races using the internet had been available for over a year at the time of the survey. A 4x3 independent measures analysis of variance was performed to examine the effects of problem gambling status and problem internet use.

The effect of problem internet use was not significant ($F(2,875)=0.075$, $p>.05$, $\eta^2=.000$). Higher problems controlling internet use (M=0.55, SE=0.22) did not lead to greater numbers of bets placed upon races, compared to moderate (M=0.49, SE= 0.19) and low problems (M=0.61, SE=0.28) controlling internet use. There was however a significant effect of problem gambling status ($F(3,875)=3.785$, $p=.01$, $\eta^2=.013$). There was a significant linear component to this effect. Problem gamblers (M=1.30, SE=0.42) reported placing more bets on races over the internet per week than people who were at moderate (M=0.67, SE=0.25) or low risk (M=0.09, SE=0.21). Problem gamblers were almost 10 times more likely to bet on races over the internet than people who were not at risk of developing gambling problems (M=0.13, SE=0.09). The effect of problem gambling status did not interact with problem internet usage ($F(6,875)=0.824$, $p>.05$, $\eta^2=.006$).

The opportunity to place bets upon sports had also been available for over a year, but unlike the races, that had preexisting opportunities to place bets by other means (e.g. TAB),

the internet has been one of the few legitimate methods of placing bets on sports. Problem gamblers reported placing significantly more bets on sports over the internet ($F(3,876)=32.598$, $p<.001$, $\eta^2=.100$). However, people with problems controlling their internet use ($F(2,876)=35.537$, $p<.001$, $\eta^2=.075$) actually place *less* bets on sports using the internet. People who did *not* have a problem limiting their internet use placed 16 times more bets (M=4.38, SE=0.42) than people who had a problem limiting their internet use (M=0.27, SE=0.34). Presumably heavier internet users have other activities over the internet with which to occupy their time. There was a significant interaction between problem gambling status and problem internet use ($F(6,876)=18.152$, $p<.001$, $\eta^2=.111$). As may be seen in Figure 11.11, problem gamblers who did not have problems controlling their internet use were reporting placing more bets on sport.

Figure 11.1. Self-reported number of bets placed on sports over the internet per week.
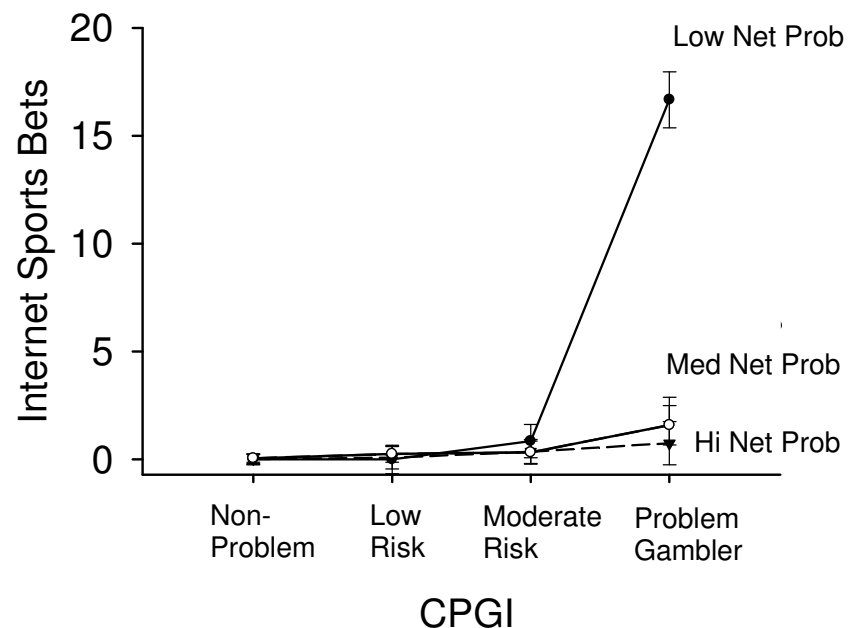
Although it is possible to purchase lottery tickets over the internet, it is a comparatively recent technology. Problem gamblers (M=0.25, SE=0.10) tended to report purchasing more lotto tickets than non-problem gamblers (M=0.39, SE=0.02), but the effect of problem gambling status only approached significance ($F(3,872)=2.473$, $p=0.06$, $\eta^2=.008$). People with problems controlling their internet use (M=0.19, SE=0.05) tended to report buying more lotto tickets than people who did not have problems controlling internet use (M=0.03, SE=0.07), but these effects were not significant ($F(3,872)=2.186$, $p>0.05$, $\eta^2=.005$), and did not interact with problem gambling status ($F(6,872)=1.104$, $p>=0.05$, $\eta^2=.008$).

These findings are to be contrasted with those addressing playing of internet poker. Both problem gamblers ($F(3,876)=7.484$, $p<0.001$, $\eta^2=.025$) and problem internet users ($F(2,876)=24.843$, $p<0.001$, $\eta^2=.054$) were significantly more likely to play poker over the internet. A significant interaction between problem gambling status and problem internet use ($F(6,876)=6.089$, $p<0.001$, $\eta^2=.040$) indicates that people who are problem gamblers and problem internet users are even more likely to report playing internet poker (see Figure 11.12).

Figure 11.12. Self-reported number of times per week participants reported playing internet poker.
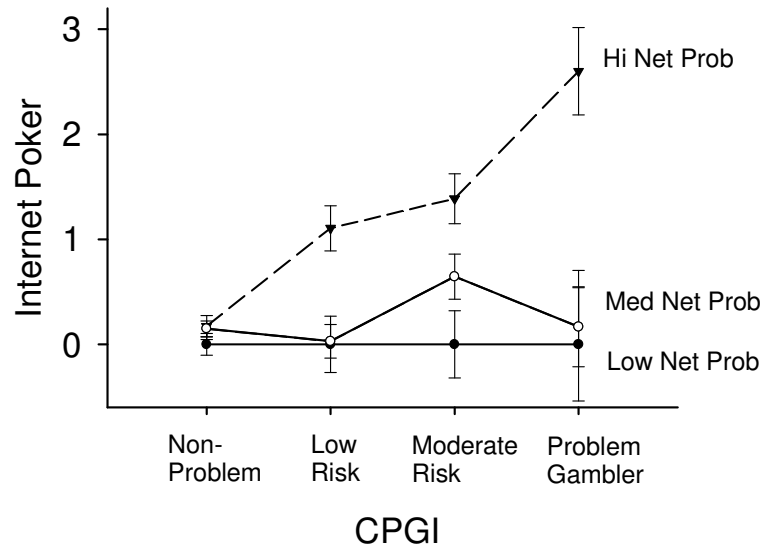
A comparison of the wagering and betting behaviour over the internet and the use of the internet to enter competitions for cash prizes could be informative. The effects of problem gambling status ($F(3,868)=0.253$, $p>.05$, $\eta^2=.001$) and problem internet use ($F(2,868)=1.268$, $p>0.05$, $\eta^2=.003$) were not significant. Nor was there a significant interaction between problem gambling status and problem internet use ($F(6,868)=1.891$, $p>0.05$, $\eta^2=.013$) upon the reported frequency of using the internet to enter competitions for cash prizes. If anything it is the people with internet problems who are not problem gamblers that are entering more competitions.

The results suggest that problem gamblers are dedicated to their gambling, and interests in technology usually distract them from their obsession. It is only specific activities (e.g. internet poker) where the technology supports and allows access to gambling where interest in technology appears to increase risk.

11.5 Interplay Between Gambling and Problem Phone Use (Landline)

The degree of risk of developing a gambling problem can be classified by the CPGI into non-problem, low risk, moderate risk, and problem gambler. Participants could also be split into two groups on the basis of their self-reported problems controlling their use of landline telephones. Splitting people into no problem (0-9), and problem (10-25) on the Landline Problem Use Scale put 12 problem gamblers into the group with no problem with their landline use, and 16 problem gamblers into the group with problems with their landline telephone use. [Splitting people at 0-9, 10-17, and 18-25 would put only 3 problem gamblers into a group with high scores on the Landline Problem Use Scale.] Based upon these classifications, it is then possible to examine whether there is an interplay between the risk of developing a gambling problem and other indicators of self control, such as the Landline Problem Use Scale

A 4x2 independent measures anova considered the effects of problem gambling status and landline problem upon the self-reported number of bets placed over the landline telephone per week. Problem gamblers reported placing significantly more bets over their landlines ($F(3,878)=2.675$, $p=.046$, $\eta^2=.009$). People who had problems with their landlines (M=0.09, SE=0.18) tended to report placing fewer bets than people who did not have problems (M=0.46, SE=0.17) controlling their landline use, but the effect was not significant ($F(1,878)=2.229$, $p>.05$, $\eta^2=.003$). Nor was the interaction between problem gambling status and problem controlling landline telephone use significant ($F(3,878)=1.982$, $p>.05$, $\eta^2=.007$). Although the interaction is not significant, it is plotted in Figure 11.13 for comparison purposes with other findings. Often when people appear dependent upon a particular technology, they seem less likely to gamble.

Figure 11.13. Self-reported number of bets placed over a landline per week.
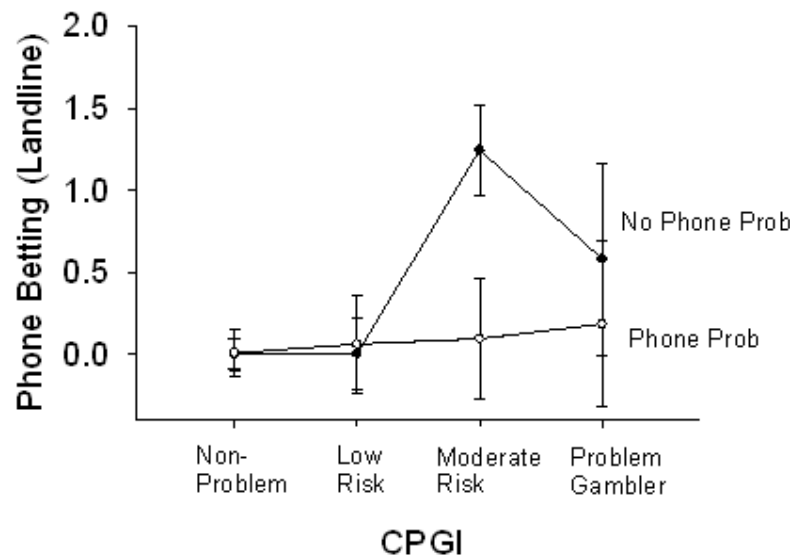
11.6 Interplay between Gambling and Problem Mobile Phone Use

As the mobile phone allows access to services anywhere and at anytime, it is of interest to consider how problems controlling mobile phone use may possibly interact with problem gambling status. As before, the degree of risk of a gambling problem can be classified by the CPGI into non-problem, low risk, moderate risk, and problem gambler. Splitting people into low (0-9), medium (10-17) and high (18-25) on the Mobile Problem Use Scale puts 9 problem gamblers into low, 12 into medium, and 7 into the high problem mobile groups. Based upon these classifications, it is then possible to examine whether there is an interplay between the risk of developing a gambling problem and other indicators of self control, such as the Mobile Problem Use Scale.

As mobile gaming is touted to be the next big product for the gaming industry, a 4x3 independent measures anova was performed to examine the effects of problem gambling status and mobile phone problems upon game playing.

There was a significant effect of mobile phone problems upon the amount of game playing reported report ($F(2,869)=10.841$, $p<.001$, $\eta^2=.024$). There was a significant linear trend indicating that as people became more dependent upon their mobile phone, they were more likely to report playing games. A person with a low score (M=4.06, SE=3.60) on the

Mobile Phone Problem Use Scale reported playing games less minutes per week than people with medium (M=25.44, SE=3.68) and high scores (M=28.81, SE=4.72). There was also an effect of problem gambling status (F(3,869)=11.405, p<.001, η^2=.038). Post hoc tests indicated that people who were at low risk of developing a gambling problem (M=36.33, SE=4.12) reported more minutes playing games on their mobiles than non-problem gamblers (M=9.143, SE=2.36), moderate risk gamblers (M=10.344, SE=4.67) and problem gamblers (M=19.11, SE=7.13). There was also a significant interaction (F(6,869)=5.563, p<.001, η^2=.037) between problem gambling status and problem mobile phone use. As may be seen in Figure 11.14, the tendency for low risk gamblers to play games was enhanced in people who reported more problems with their mobile phone use.

Figure 11.14. Self-reported amount time (minutes) spent playing games on a mobile phone per week.
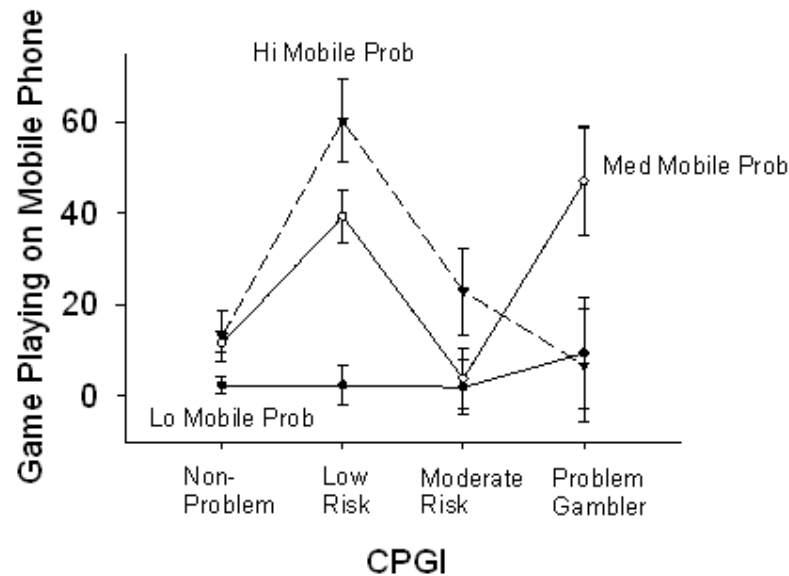
Other indicators of interest in mobile gaming are self-reported willingness to purchase, vote, and enter competitions using their mobile phone. People were asked how often they used their mobile phone to purchase items such as ringtones and wallpaper. People reporting problems controlling their mobile phone use were significantly more likely to report using their mobile to make purchases (F(2,866)=21.823, p<.001, η^2=.048). There was again a significant linear trend indicating that as people became more dependent upon their mobile phone, they were more likely to report making purchases. A person with a low score (M=0.02, SE=0.18) on the Mobile Phone Problem Use Scale reported making fewer purchases per week than people with medium (M=0.47, SE=0.19) and high scores (M=1.98, SE=0.24). Problem gambling status was also associated with significant differences in the use of mobile phones to make purchase (F(3,866)=16.873, p<.001, η^2=.055). Post hoc tests indicated that low risk (M=1.48, SE=0.20) and problem gamblers (M=1.55, SE=0.35) were more likely to use their mobile phones to make purchases than non-problem (M=0.07, SE=0.11) and moderate risk (M=0.20, SE=0.22) gamblers. A significant interaction (F(6,866)=7.818, p<.001, η^2=.051) indicates that this tendency is increased when people have problems with their mobile phone use (see Figure 11.15).

Figure 11.15. Self-reported number of purchases made using a mobile phone per week.
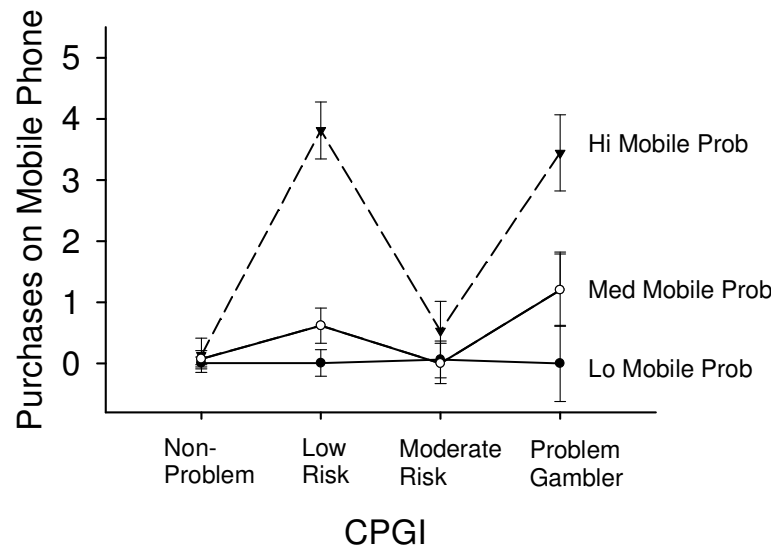
As sport betting is sometimes equated with "support" for one's team, it could be informative to consider the use of mobile phones to vote (register preferences). There was a significant effect of problem mobile phone use (F(2,866)=7.852, p<.001, η^2=.018). A significant linear trend indicated that people who reported high (M=0.97, SE=0.21) and medium (M=0.84, SE=0.16) problems controlling their mobile phone use were more likely to use their mobile phone to vote than people who reported low (M=0.10, SE=0.16) problems controlling their mobile phone use. For some reason there was also a significant effect of problem gambling status on voting behaviour (F(3,866)=4.199, p<.01, η^2=.014). A significant linear trend indicated that problem gamblers (M=1.13, SE=0.30) were more likely to vote using their mobile phones than moderate (M=0.69, SE=0.19), low risk (M=0.52, SE=0.17) and non-problem (M=0.22, SE=0.09) gamblers. Although not significant (F(6,866)=1.794, p=.097, η^2=.012) the interaction between problem mobile phone use and problem gambling status may be seen in Figure 11.16. It suggests that gamblers are not going to vote using mobile phones unless has they have problems controlling their mobile phone use as well.

Figure 11.16. Number of times participants report voting using their mobile phones per week.
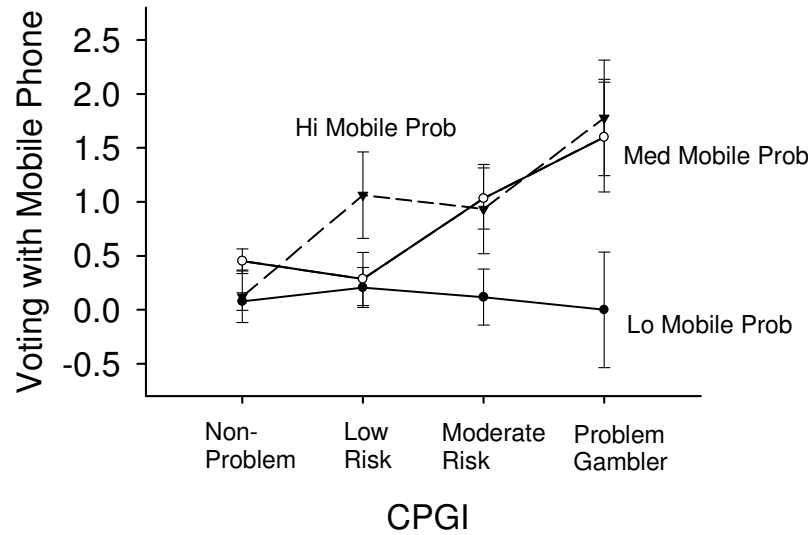
The potential interest in mobile gaming may also be inferred from willingness to use mobile phones to enter competitions. There was a significant effect of mobile phone problems upon self-reported use of SMS to enter competitions for cash prizes offered in magazines ($F_{(2,863)}=6.981$, $p<.001$, $\eta^2=.016$). A significant linear trend indicated that people with higher problems controlling their mobile phone use (M=3.35, SE=0.64) entered more competitions than people with moderate (M=2.57, SE=0.50) or low (M=0.61, SE=0.49) problems controlling their mobile phone use. There was also a significant effect of problem gambling status ($F_{(3,863)}=6.101$, $p<.001$, $\eta^2=.021$). A significant linear trend indicated a greater likelihood of using SMS to enter competitions with increasing risk of a gambling problem. A significant interaction ($F_{(6,863)}=5.460$, $p<.001$, $\eta^2=.037$) may be seen in Figure 11.17. People at risk of a gambling problem that also have problems controlling their mobile phone use are more likely to use SMS to enter competitions for cash advertised in magazines.

Figure 11.17. Number of times participants report using SMS to enter competitions per week.
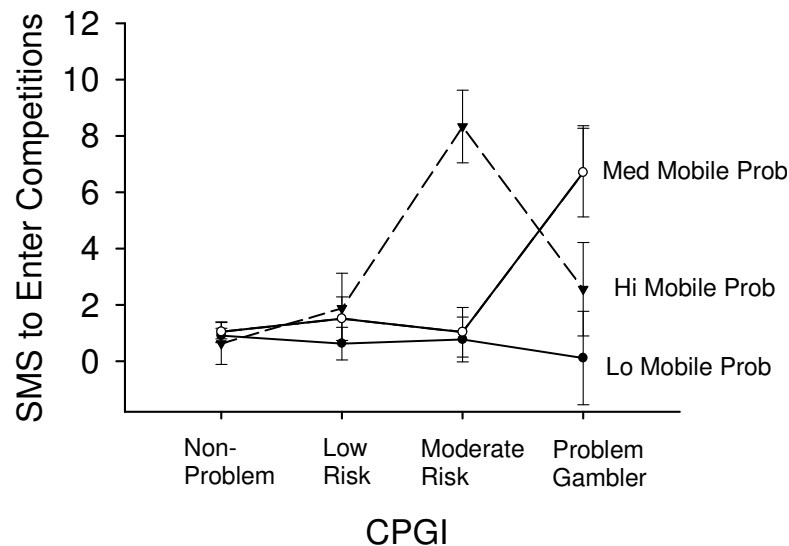
As premium SMS can serve as a method of funds transfer, we were particularly interested in whether people entered competitions for cash prizes that involved SMS costing more than 55c a call. This question proved disappointing. There was no effect of mobile phone problem ($F(2,867)=2.5499$, $p=.075$, $\eta^2=.006$), problem gambling status ($F(3,867)=0.876$, $p>.05$, $\eta^2=.003$), nor was there a significant interaction ($F(6,867)=1.213$, $p>.05$, $\eta^2=.008$). This would appear to reflect the nature of the question asked. Many of the competitions offered on mobile phones charge between \$3 and \$6 to receive a "reminder" or an entry form, but only charge an ordinary 25c or 55c call to *enter* the competition. As such competitions typically take the form of a SMS mailing list, we report analysis of data on SMS lists here.

Problem gamblers report being contacted significantly more often by SMS mailing lists ($F(3,867)=8.402$, $p<.001$, $\eta^2=.028$). A significant linear trend indicating that problem gamblers (M=1.94, SE=0.34) are contacted by SMS mailing lists more than moderate (M=1.49, SE=0.21), low risk (M=1.19, SE=0.19) and non-problem (M=0.66, SE=0.10) gamblers. Problem phone use also increased the likelihood of been contacted by SMS mailing lists ($F(2,867)=6.353$, $p<.01$; $\eta^2=.014$). Although problem gamblers are more likely to be contacted, it does not seem to be exacerbated by problems controlling mobile phone use, as the interaction ($F(6,867)=1.298$, $p>.05$; $\eta^2=.009$) was not significant.

A need to unsubscribe to mailing lists seems to be linked to both problem gambling and problem mobile phone use. There was a significant effect of both problem mobile phone use ($F(2,865)=7.710$, $p<.001$; $\eta^2=.018$), and problem gambling status ($F(3,865)=13.923$, $p<.001$; $\eta^2=.046$). The interaction approached significance ($F(6,865)=1.902$, $p=.078$; $\eta^2=.013$) is plotted in Figure 11.18. A person who is a problem gambler and has problems controlling their mobile phone use is more likely to be unsubscribing to SMS mailing lists.

Figure 11.18. Number of times reported unsubscribing to SMS mailing lists per week.
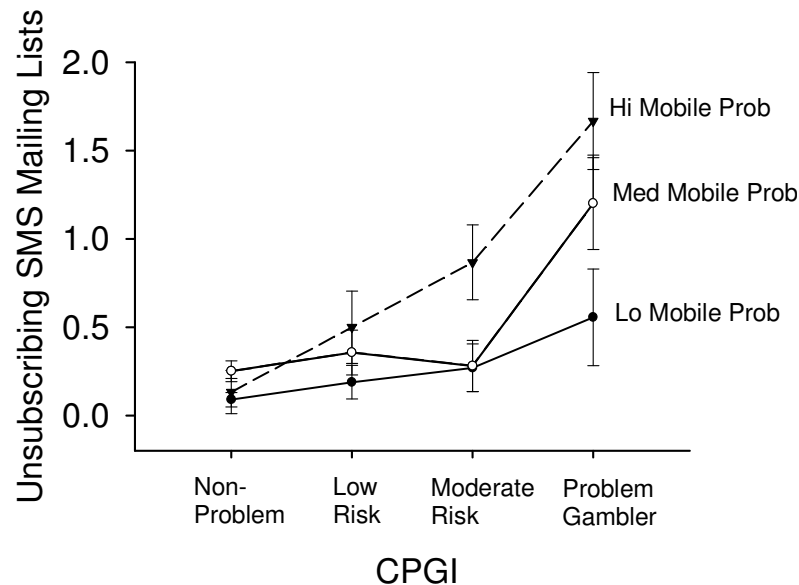
One of the means whereby people get on SMS mailing lists is by entering competitions promoted by members of the Direct Marketing Association of Australia. Nevertheless, there may be other means of getting on these mailing lists. One of the services that can be provided by aggregators of SMS messages is calculation. People can SMS some details to a number (e.g. a boy and girl's name), some calculations are performed and a response can be sent back (e.g. compatible). Other examples of such systems are services offering to calculate a blood alcohol concentration. The survey asked questions associated with this form of application. Participants were asked how often they used SMS on their mobile phones to calculate things such as sexual compatibility and blood alcohol concentration. Problem gamblers were significantly more likely to use such services $(F(3,862)=15.687, p<.001, \eta^2=.052)$, as were people with problems controlling their mobile phone use $(F(2,862)=17.791, p<.001, \eta^2=.040)$. There was also a significant interaction between problem gambling and problems controlling mobile phone use $(F(6,862)=9.827, p<.001, \eta^2=.064)$. As may be seen in Figure 11.19, people who have problems controlling their mobile phone use, particularly problem gamblers, are using SMS for calculations. But we doubt that the calculations are being requested to determine sexual compatibility or blood alcohol concentrations. This question was directed towards a specific capability and application of SMS technology, and it appears that there are a number of wagering and tipping sites that utilise this technology, such as "sportsbet" (https://www.sportsbet.com.au/content/general-info/sms-policy) and "tipster" (http://www.sports-tipsters.co.uk/).

Figure 11.19. Number of times reported using mobile phone calculation services per week.
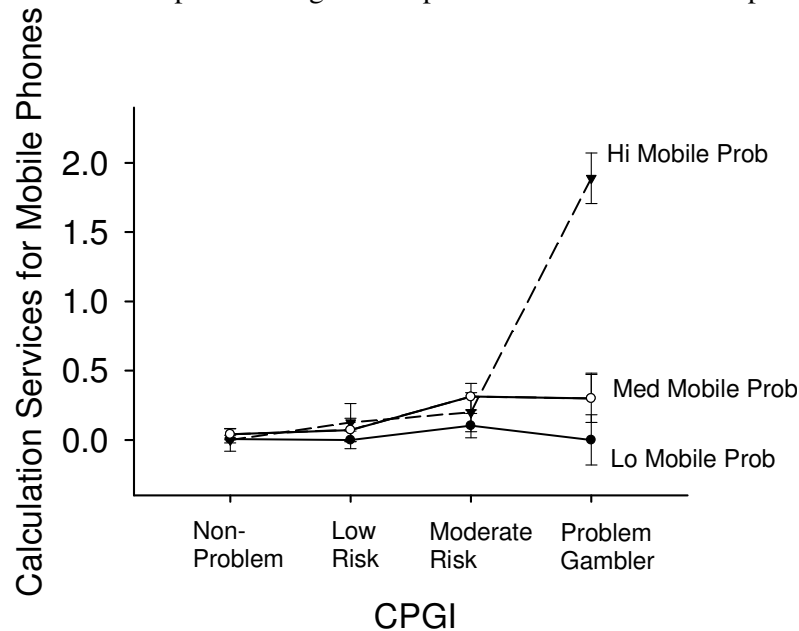
11.7 Summary

One of the criteria for diagnosis of a gambling problem in DSM-IV is that of preoccupation with gambling. Rosecrance (1988) and Walker (1992) observed that problem gamblers devote larger proportions of their time to gambling. At the time of the present survey, people who devoted more time to television, radio, internet or phones were less likely to have the time to devote to gambling. The entertainment distracts the person away from gambling. Nevertheless there are some activities where an interest in a technology has the potential to exacerbate a gambling problem. Prize shows, home shopping, voting, and SMS calculation services all appear to attract the interest of people who have problems controlling their technology use AND problem gamblers. Such applications may serve as pathways that can direct people with an interest in a specific technology into gambling.

11.8 References

Armstrong, L., Phillips, J.G., & Saling, L.L. (2000). Potential determinants of heavier Internet usage. *International Journal of Human Computer Studies, 53*, 537-550.

Bianchi, A., & Phillips, J.G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology & Behavior, 8*(1), 39-51.

Phillips, J.G., Butt, S., & Blaszczynski, A. (2006). Personality and self-reported use of mobile phones for games. *CyberPsychology & Behavior, 9*(6), 753-758.

Rosecrance, J. (1988). Professional horse race gambling: Working without a safety net. In W.R. Eadington (Ed.), *Gambling research: Proceedings of the seventh international conference on gambling and risk taking* (pp. 11-37). University of Nevada-Reno.

Walker, M.B. (1992). *The psychology of gambling*. Oxford: Pergamon Press.

12. Survey Results – Factor Analysis

12.1 Interaction and Emergent Techology

An exploratory Factor Analysis was performed on the data in order to identify potential latent variables underlying gambling and the use of interactive services. As the interest was on gambling and interaction the analysis did not include viewing and listening habits for entertainment technologies. Hence the analysis addresses electronic *interaction* rather than the more static viewing and listening habits.

Correlation matrices indicated that several items were highly correlated. Questions associated with betting on sports and races were repeated across the Television and Radio sections of the questionnaire and correlated higher than 0.9. Due to concerns about problems of multicollinearity (a violation of assumptions of factor analysis) the questions on betting on races in the television section and the question on betting on sports in the radio section were dropped from analysis.

12.2 Factor Analysis

A principal components analysis (PCA) was conducted on the 31 variables with oblique rotation (Oblimin). Even after transforms, many of the variables of interest (wagering and use of interactive services) returned individual Kaiser-Meyer-Olkin (KMO) values that were less than 0.5. This probably occurred because they were less frequent activities. Nevertheless the KMO measure verified the sampling adequacy for the analysis with overall KMO = 0.824. Bartlett's test of sphericity ($\chi^2(465)$=8044.378, p<.001) indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain eigenvalues for each component in the data. Eight components had eigenvalues greater than 1 and in combination explained 58.68% of the variance. Nevertheless the scree plot suggested retaining just 4 meaningful factors that would explain 43.475% of the variance. Table 12.1 shows the factor loadings after rotation. The items that cluster on component 1 suggest that this represents use of interactive services. Hence this factor will be called interactivity. The items clustering on component 2 indicates that this represents a gambling and wagering factor. Hence this factor will be called Gambling. Component 3 has loadings on scales addressing problems controlling technology use and so this factor will be called Problem Technology use. Component 4 has loadings on items addressing competitions, and so this factor will be called Competitions.

The factor addressing interactivity seems to be tapping into a trait of impulsivity. Many of the items loading on this factor manifest as transitory opportunities resembling auctions where people are urged to respond before an opportunity is lost. Those items involving mobile phones when presented on the television also have an element of time pressure in that the numbers to phone to purchase a ring tone or wall paper are only shown briefly. Hence the first factor seems to address interactivity and variables that encourage responding (i.e. time pressure, or auctions) and encourage the use of interactive technology.

Table 12.1. Factor loadings.

Item	Interactivity	Gambling	Problem Technology Use	Competitions
How often do you purchase products advertised on the home shopping programs on TV?	**.722**	.122	.056	-.055
How often do you use your mobile phone to purchase items in a typical week (e.g. ringtones, wallpaper)?	**.687**	-.003	-.029	.003
How often do you use SMS on your mobile phone to calculate things such as sexual compatibility or blood alcohol concentration?	**.682**	.074	.004	-.042
How many times did you phone the late night prize shows in a typical week?	**.568**	.035	.203	.062
How often do you use your mobile phone to vote (register preferences) in a typical week?	**.535**	-.012	-.068	.341
In a typical week how many times do you send in a vote for a reality TV program?	**.527**	.012	.000	.353
How often do you use the Internet to buy Lotto tickets in a typical week?	**.522**	.019	.008	.007
How many times a week do you typically use the telephone (landline) to buy things?	.281	.090	.164	.091
How often do you bet on the outcome of the races in a typical week (include horses, greyhounds and trotting)?	-.124	**.880**	.007	.072
How many sporting events do you usually bet on in a week?	.037	**.832**	-.042	-.053
How often do you use the Internet to place bets on races in a typical week?	-.044	**.747**	-.066	-.016
How many times a week do you typically use the telephone (landline) to place bets?	.002	**.686**	.028	.047
How often do you use the Internet to place bets on sports in a typical week?	.241	**.634**	-.089	-.085
Risk of developing a gambling problem (as per CPGI)	.019	**.408**	.165	.045
Phone Problem Use Scale	.031	.032	**.758**	.030
Radio Problem Use Scale	.070	.007	**.720**	.071
TV Problem Use Scale	.008	-.071	**.712**	-.053
Mobile Phone Problem Use Scale	.025	-.018	**.647**	-.016
Internet Problem Use Scale	-.164	-.069	**.546**	.086
Interest in Access to Digital Services Scale	.096	.129	**.308**	-.054
How often do you use SMS on your mobile phone to enter competitions for cash prizes offered in magazines?	-.079	-.027	-.047	**.834**
How often do you enter SMS competitions for cash prizes offered on the TV?	.058	.000	-.018	**.755**
How often do you enter SMS competitions for cash prizes on the Radio in a typical week?	.137	.051	.050	**.721**
How often do you use the Internet to enter competitions for cash prizes in a typical week?	-.211	-.009	.033	**.711**
How often do you phone in to a radio program to participate in a competition in a typical week?	.223	.084	.103	**.569**
Interest in Credit and Consumer Loyalty Scale	-.065	.006	-.032	-.042
How many times in a typical week do you use the Internet to make purchases?	.131	.036	-.022	.154
How regularly do you unsubscribe to an SMS mailing list in a typical week?	.129	.011	.004	.185
How regularly are you contacted by some SMS mailing list in a typical week?	.087	-.024	.076	.169
How many minutes a week do you spend using your mobile phone to play games?	.129	.000	-.032	-.010
Dissatisfaction with Electronic Services Scale	-.041	-.006	.038	-.050
Eigenvalues	6.794	3.035	2.060	1.589
% of variance	21.915	9.789	6.645	5.126

The second factor addresses gambling. It loads highly on a variety of forms of betting and wagering and is correlated (0.408) with a person's risk of being a problem gambler. Compared with the other factors the primary concern is with money rather than the immediacy of response probably associated with the first factor.

The third factor addresses problem technology use. The scales associated with problem technology use tend to predict the amounts of time spent using a specific technology. This factor correlates with the scale addressing people's interest in accessing digital services. Hence the third factor may be assessing a preoccupation with technology as a method of distraction or a form of procrastination.

In his study of extraversion, Brebner (1980) distinguished between two forms of inhibition. Brebner (1980) invoked separate mechanisms for stimulus excitation/inhibition and response excitation/inhibition. Based upon laboratory-based research, Brebner (1980) suggested that some individuals (extraverts) are predisposed to respond, whereas other individuals (introverts) are predisposed to inspect stimuli. There is some evidence to support this position (e.g. Brebner & Cooper, 1974; Brebner & Flavel, 1978). Hence the first factor may reflect problems inhibiting responding ("I can't stop myself from doing it"), whereas the third factor may represent problems controlling one's viewing/listening behaviour ("I can't look away"). The suggestion that some people are "doers" and others are "lookers" is simplistic, but it may apply to components one and three. Where the tendencies measured in component one impair social and occupational functioning the tendencies could be described as impulsive. Where the tendencies in component three impair social and occupational functioning the tendencies could be described as obsessive.

The fourth factor addresses competitions. The items loading on this factor address competitions rather than obvious gambling. Competitions do not necessarily involve cash prizes and until the advent of emergent technologies the only cost of entry may have been a participant's time and possibly a postage stamp. This situation has blurred for some electronic competitions involving SMS for entry. The use of premium SMS (namely 55c or more per message) means that some competitions resemble lotteries.

As oblique rotations were employed, it is possible to consider the relationships between the various factors (see Table 12.2). As a factor, Interactivity tended to correlate with the Gambling, Problem Technology Use and Competitions factors. Gambling did not correlate with Problem Technology Use or Competition factors. This is probably because the technologies differ, and not all of these technologies would have supported gambling in December 2008 (e.g. TV). The lower correlation between the Competitions and the Gambling factor probably reflects the differing emphasis of the activity. The primary focus of gambling is hazarding money on a chance outcome, whereas a competition is more likely to hazard effort and in some cases the outcome may require some skill (e.g. crosswords, sudoku). The correlation between the Competition and the Interactivity factor is liable to arise as some competitions may now be entered using SMS. The correlation between the Competition and the Gambling factor, although low, may in part occur because some competitions (e.g. SMS trivia) *resemble a system for generating lottery tickets* (i.e. prize outcomes appear to depend upon luck rather than knowledge) .

As would be expected the factor that correlates most strongly with risk of developing a gambling problem as measured by the CPGI was the Gambling Factor. Nevertheless there was a correlation (0.165) between risk of developing a gambling problem as measured by the

CPGI and the Problem Technology Use factor. The correlation is low because these technologies can serve a protective role distracting and entertaining people. There are only certain activities and technologies that currently support/promote gambling and thus potentiate the risk for problem gamblers.

Table 12.2. Intercorrelations between Factors.

Component	Interactivity	Gambling	Problem Technology Use	Competitions
Interactivity	1.000	.321	.216	.315
Gambling	.321	1.000	.089	.118
Problem Technology Use	.216	.089	1.000	.231
Competitions	.315	.118	.231	1.000

12.3 Summary

The possible factors underlying the use of interactive services and gambling were considered. Four factors could explain the use of interactive services. One factor seemed to be a tendency to respond impulsively that predicted the use of interactive services. A second factor appeared to be that of an interest in gambling. A third factor appeared to be a preoccupation with technology to entertain. A fourth factor seemed to be an interest in competitions. These factors were to some extent correlated. A Gambling factor correlated more with the factor addressing Impulsive Interactivity rather with the factor addressing preoccupation with technology for the purposes of entertainment. This structure may change as more propositions are developed to interest gamblers.

12.4 References

Brebner, J. (1980). Reaction time in personality theory. In A.T. Welford (Ed.), *Reaction Times* (pp. 309-320. London: Academic Press.

Brebner, J. & Cooper, C. (1974). The effect of a low rate of regular signals upon the reaction times of introverts and extraverts. *Journal of Research in Personality, 12*, 306-311.

Brebner, J. & Flavel, R. (1978). The effects of catch-trials on speed and accuracy among introverts and extraverts in a simple RT task. *British Journal of Psychology, 69*, 9-15.

13. Survey Results – Interest and Dispute

13.1 Potential for Dispute

Section 10 identified interactive services that are of interest to gamblers. Section 11 demonstrated that a tendency toward problematic use of a technology can exacerbate risk for specific interactive services or may serve as a pathway towards developing a gambling problem. [Note that problems limiting use of a specific technology may also protect a person from developing a gambling problem.] The present section considers which variables are better predictors of people's orientation towards technology, with specific emphasis towards potential areas of dispute.

Many of the variables considered in Section 10 and 11 were appreciably skewed (even after transforms, see Lund, 2008) hence a more robust technique (analysis of variance) was employed in preference to less robust techniques such as multiple regression.   As the scales under consideration in Section 13 were more normally distributed, multiple regression was employed, given that outliers are potentially of interest (i.e. problem gamblers), we report findings with the outliers included, but check whether the findings remain the same after outliers are removed.

13.2 Access to Digital Services

A number of scales addressed availability of digital services (e.g. cable TV, internet access). Five scales addressing access to digital services were combined to produce a scale addressing interest in access to digital services. The scales combined may be seen in Table 13.1.

Table 13.1. Questions assessing an interest in access to digital services.

Question
I like to subscribe to cable television networks (e.g. SkyChannel, *Foxtel* etc.).
I prefer to visit places (e.g. Hotels, Motels) that subscribe to cable television networks (e.g. SkyChannel, *Foxtel*, etc.).
I will only choose to stay in hotels with free Internet connections when I travel
I frequently use Internet cafes to go online on the Internet
We should all take up digital television as soon as possible.

A multiple regression was conducted to determine which variables could predict interest in access to digital services (see Table 13.2). A significant proportion of the variance (17.5%) could be accounted for ($F(10,782)=17.759$, $p<.001$) by the study variables. Higher scores on the Internet Problem Use Scale ($t(782)=4.430$, $p<.001$), the Mobile Phone Problem Use Scale ($t(782)=2.620$, $p<.01$) and the Radio Problem Use Scale ($t(782)=2.480$, $p<.05$) all emerged as significant predictors of interest in digital access. In addition, male gender ($t(882)=4.657$, $p<.001$) and a greater risk of problem gambling ($t(782)= 3.294$, $p<.001$) also predicted interest in digital access. In the present survey, people who were male and have problems controlling their Internet, Mobile Phone, or Radio use, who were at greater risk of a gambling problem, were more interested in access to digital services. When the analysis is repeated with 5 multivariate outliers removed, the significant predictors remain unchanged.

Table 13.2. Predictors of interest in access to digital services.

Predictor	B	t	p
Problem Gambler	.703	3.294	.001
TV Problem Use Scale	.041	1.142	.254
Radio Problem Use Scale	.091	2.480	.013
Internet Problem Use Scale	.145	4.430	.000
LandLine Problem Use Scale	.060	1.663	.097
Mobile Phone Problem Use Scale	.094	2.620	.009
Age	.010	.657	.511
Income	.004	.873	.383
Education	.136	1.212	.226
Gender	-1.663	-4.657	.000

13.3 Behavioural indices of interest

Self report may not necessarily be an indicator of actual interest in electronic services. Whether due to lack of insight (Nisbett & Wilson, 1977) or unreliable memory (Ericsson & Simon, 1980), people may not know how much time they devote to electronic services. This is an issue because the provider of electronic services can potentially track usage in precise detail (Shaffer, Peller, LaPlante, Nelson, & LaBrie, 2010). Hence as a behavioural measure, to provide some converging lines of evidence to support the self report survey questionnaire, participants were asked what they would like to see at the next link.

At a behavioural level, problem gambling status is significantly associated with people's interests on the internet. People's risk of developing a gambling problem, as indicated by the CPGI is significantly associated with the sorts of information people request at the next link as indicated by a significant chi square statistic (χ^2 (9df)=98.064, p<.001). As may be seen in Table 13.3, with greater risk of gambling problems, there seems to be a greater interest in counselling or gambling information at the next link. Compared to participants that were not at risk of a gambling problem, the present data suggest that problem gamblers were 17.8 times more likely to click on a link related to gambling, and 7.5% more likely to click on a link related to counselling.

Table 13.3. Problem gambling status as a predictor of internet interest as indicated by exit preferences.

	Regulatory	Counselling	Gambling	Nothing	Total
Non-Problem	164 (25.3%)	28 (4.3%)	8 (1.2%)	449 (69.2%)	649 (100%)
Low Risk	37 (28.0%)	9 (6.8%)	6 (4.5%)	80 (60.6%)	132 (100%)
Moderate Risk	17 (19.8%)	4 (4.7%)	9 (10.5%)	56 (65.1%)	86 (100%)
Problem Gambler	4 (14.3%)	9 (32.1%)	6 (21.4%)	9 (32.1%)	28 (100%)
Total	222 (24.8%)	50 (5.6%)	29 (3.2%)	594 (66.4%)	895 (100%)

13.4 Interest in Credit Schemes

A number of questions addressed participants' preferences with respect to financial transactions. Questions addressing credit, preference for cash, EFTPOS or prepaid were examined and may be seen in Table 13.4.

Table 13.4. Questions addressing an interest in credit schemes.

Question
I prefer to use a credit card for financial transactions.
I (don't) prefer to use cash for financial transactions.
I like to belong to consumer loyalty programs (e.g. Flybuys, Frequent Flyer, Community Benefit, Casino Club etc.).

The results were disappointing. Although a greater use of credit could be construed as creating risk, the data suggested that an interest in credit was not related to gambling problems. Nevertheless it does give some indicator as to the sorts of people that might be "tracked" by consumer loyalty programs. A multiple regression was conducted to determine predictors of interest in the use of credit for financial transactions (see Table 13.5). A significant proportion of the variance (12.8%) could be accounted for ($F(10,789)=12.701$, $p<.001$) by the study variables. Higher scores on the Internet Problem Use Scale ($t(789)=3.118$, $p<.001$), older age ($t(789)=4.909$, $p<.001$), higher income ($t(789)=6.354$, $p<.001$), with higher education levels ($t(789)=3.409$, $p<.001$) and female gender ($t(789)=2.793$, $p<.01$) all emerged as significant predictors of interest in credit. In the present survey, people who were older, female, better educated, with a higher income and had problems controlling their internet use were more interested in credit (see Table 13.5). When the analysis is repeated with 6 multivariate outliers removed, the significant predictors remain unchanged.

Table 13.5. Predictors of interest in credit schemes.

Predictor	B	t	p
Problem Gambler	-.188	-1.202	.230
TV Problem Use Scale	-.014	-.546	.585
Radio Problem Use Scale	.027	.999	.318
Internet Problem Use Scale	.075	3.118	.002
LandLine Problem Use Scale	-.021	-.801	.424
Mobile Phone Problem Use Scale	-.021	-.791	.429
Age	.056	4.909	.000
Income	.024	6.354	.000
Education	.279	3.409	.001
Gender	.731	2.793	.005

13.5 Concern about Spam

A number of questions addressed participants' concern for electronic privacy, asking questions about the amounts of spam received, and their attempts to unsubscribe from mailing lists. The correlations between some items were low, hence the questions could not be bundled together to produce a single scale. Questions on SMS mailing lists clearly reflect

mCommerce issues. Questions addressing complaint mechanisms would appear to address dissatisfaction with current protective measures.

A multiple regression was conducted to determine predictors of self-reported receipt of SMS spam (see Table 13.6). A significant proportion of the variance (11.7%) could be accounted for ($F(10,791)=11.604$, $p<.001$) by the study variables. Problem gamblers ($t(791)=4.604$, $p<.001$) reported being contacted more often by SMS mailing lists. Higher levels of education ($t(791)=2.941$, $p<.001$), and problems controlling mobile phone use ($t(791)=4.453$, $p<.001$) also predicted higher levels of SMS spam. SMS spam was not a problem for people who reported greater dependency upon landlines ($t(791)=-1.983$, $p<.05$). Participants reporting problems controlling their radio listening ($t(791)=2.580$, $p<.01$) also reported higher levels of SMS spam (see Table 13.6). At the time of this survey it would appear that people who are reporting higher levels of SMS spam were problem gamblers, people who reported problems controlling their mobile phones and radio use (rather than landline users), and individuals that were better educated. When the analysis is repeated with 8 multivariate outliers removed, problem gambling, greater problems controlling radio and mobile phone use and greater education remain as significant predictors.

Table 13.6. Predictors of self-reported receipt of Spam.

Predictor	B	t	p
Problem Gambler	.046	4.604	.000
TV Problem Use Scale	.002	1.087	.277
Radio Problem Use Scale	.004	2.580	.010
Internet Problem Use Scale	.002	1.459	.145
LandLine Problem Use Scale	-.003	-1.983	.048
Mobile Phone Problem Use Scale	.007	4.453	.000
Age	.001	1.508	.132
Income	.000	-1.617	.106
Education	.015	2.941	.003
Gender	-.006	-.339	.735

A consideration of the self-reported rates at which people unsubscribe to SMS mailing lists suggests that these mailing lists are a greater problem for problem gamblers and people who have problems controlling their radio listening habits (see Table 13.7). A multiple regression explained a significant (7.2%) amount of SMS unsubscription ($F(10,790)=7.185$, $p<.001$). At the time of this survey, people who were at higher risk of gambling problems as indicated by the CPGI ($t(790)=4.226$, $p<.001$) and people who reported more problems controlling their radio listening ($t(790)=2.439$, $p<.01$) and mobile phone use ($t(790)=2.324$, $p<.05$) were more likely to report unsubscribing to SMS mailing lists (see Table 13.7). When the analysis is repeated with 18 multivariate outliers removed, problem gambling, greater problems controlling mobile phone use, older age and lower income are significant predictors. However of the 18 multivariate outliers screened, 3 of the 18 were problem gamblers as classified by the CPGI, hence this procedure does tend to exclude a higher proportion of the population of interest.

Table 13.7. Predictors of unsubscriptions to SPAM.

Predictor	B	t	p
Problem Gambler	.027	4.226	.000
TV Problem Use Scale	.000	-.777	.437
Radio Problem Use Scale	.003	2.439	.015
Internet Problem Use Scale	.001	1.388	.165
LandLine Problem Use Scale	.001	.670	.503
Mobile Phone Problem Use Scale	.002	2.324	.020
Age	.001	1.104	.270
Income	.000	-1.881	.060
Education	.006	1.672	.095
Gender	-.005	-.450	.653

13.6 Potential for complaint

Questions addressing complaints or the act of unsubscribing were examined. The three questions in Table 13.8 generated a scale that addresses a dissatisfaction with current measures that are in place to protect electronic privacy.

Table 13.8. Dissatisfaction with protective measures.

Question
I believe that complaints about telemarketers have no effect upon the numbers of unwanted phonecalls I receive.
I believe that unsubscribing to an electronic mailing list has no effect upon the amount of SPAM I receive.
I believe that unsubscribing to an SMS is of no use at all.

A multiple regression was conducted to determine predictors of dissatisfaction with electronic privacy (see Table 13.9). A significant proportion of the variance (1.5%) could be accounted for ($F_{(10,789)}=2.199$, $p<.05$) by the study variables, but the proportion explained was low. More self-reported problems controlling internet use ($t_{(789)}=2.075$, $p<.05$), and lower education levels ($t_{(789)}=-2.672$, $p<.01$) predicted greater dissatisfaction with electronic privacy (see Table 13.9). In the present survey, people who reported more problems controlling their internet use and were less educated were more dissatisfied with current levels of electronic privacy. When the analysis is repeated with 5 multivariate outliers removed, the significant predictors remain unchanged.

Table 13.9. Predictors of dissatisfaction with measures protecting electronic privacy.

Predictor	B	t	p
Problem Gambler	-.166	-1.084	.279
TV Problem Use Scale	.017	.646	.518
Radio Problem Use Scale	.046	1.742	.082
Internet Problem Use Scale	.048	2.075	.038
LandLine Problem Use Scale	-.010	-.397	.691
Mobile Phone Problem Use Scale	.002	.074	.941
Age	-.002	-.224	.823
Income	.004	1.080	.280
Education	-.213	-2.672	.008
Gender	-.083	-.325	.745

13.7 Sources of assistance

Gamblers and people who report problems controlling their technology use tend to be interested in digital access and also tend to report higher levels of SPAM and unsubscribing behaviour. The following analyses addresses the methods that people would adopt in the advent of dispute or problem.

Table 13.10 provides the proportions of individuals that would seek assistance from a specific source if they had a problem, or were upset with the services they received. If a person has problems with most technologies they appear to either contact the provider of the service or not seek assistance at all (deal with the problem themselves).

Table 13.10. Sources of assistance in the event of problems.

Content	Nobody	Friend	Church	Provider	Industry	Government	Other	N
Internet	23.1	6.6	0.1	50.3	10.6	7.2	2.1	1010
Mobile Phone	11.6	3.6	0.2	71.5	7.5	4.3	1.4	1002
Radio	29.7	4.9	0.1	37.4	17.9	7.9	2.2	1006
TV	27.5	4.9	0.2	33.6	20.6	11.4	1.8	998
Cable TV	20.2	2.8	0.0	56.7	9.5	4.6	6.3	1005
Average	22.42	4.56	0.12	49.9	13.22	7.08	2.76	

Table 13.11 provides the proportions of individuals that would seek assistance from a specific source if they had problems with their gambling. If a person has a problem with their gambling they are most likely to seek assistance from a counsellor or a friend. The expected

source of assistance has shifted from the provider to other individuals. This may not be a problem when gambling in a "face-to-face" situation when dealers and floor staff are trained to identify people with problems (e.g. Schellinck & Schrans, 2004) and refer them to other staff trained to deal with upset patrons. However this is potentially a problem when accessing a gambling product electronically, as people are searching for assistance within a series of menus from an unregulated organisation that has caused the problem in the first place (Monaghan, 2009).

Table 13.11. Sources of assistance in the event of gambling problems.

	Nobody	Friend	Church	GP	Counsellor	Provider	Industry	Government	Other	N
Gambling	13.5	18.9	2.3	5.7	44.7	0.8	4.1	3.4	6.7	1010

Participants were asked the source of assistance they would approach if they had a gambling problem. Cell frequencies may be seen in Table 13.12. There were potentially relationships between participants' risk of developing a gambling problem, as indicated by the CPGI and the sources they would choose for assistance as indicated by a significant chi square statistic (χ^2 (24df)=43.518, p<.01), but the result should be viewed with caution, as cell frequencies were low, and this causes a problem for this statistical test.

Table 13.12. Sources of assistance chosen as a function of problem gambling status as indicated by the CPGI.

	Nobody	Friend	Church	GP	Counsellor	Gaming Venue	Industry Body	Regulatory Body	Other	Total
Non-Problem	78 (12.0%)	122 (18.7%)	18 (2.8%)	41 (6.3%)	294 (45.1%)	3 (0.5%)	29 (4.4%)	24 (3.7%)	43 (6.6%)	652 (100%)
Low Risk	17 (12.9%)	36 (27.3%)	1 (0.8%)	6 (4.5%)	57 (43.2%)	0 (0%)	5 (3.8%)	4 (3.0%)	6 (4.5%)	132 (100%)
Moderate Risk	15 (17.2%)	12 (13.8%)	2 (2.3%)	6 (6.9%)	39 (44.8%)	3 (3.4%)	5 (5.7%)	3 (3.4%)	2 (2.3%)	87 (100%)
Problem Gambler	6 (21.4%)	2 (7.1%)	0 (0%)	0 (0%)	16 (57.1%)	2 (7.1%)	0 (0%)	1 (3.6%)	1 (3.6%)	28 (100%)
Total	116 (12.9%)	172 (19.1%)	21 (2.3%)	53 (5.9%)	406 (45.2%)	8 (0.9%)	39 (4.3%)	32 (3.6%)	52 (5.8%)	899 (100%)

In an attempt to address potential problems with the assumptions of the statistical test, Table 13.13 collapses some of the smaller cells associated with sources of assistance with a gambling problem, and deletes the unclassified "other" source of assistance. Sources of assistance such as the Church, GP and Counsellors are merged as "Professionals". Sources of assistance such as the Gaming Venue, Industry Body, and Regulatory Body are merged as "Organisation". Although no longer significant (χ^2(9 df)=14.901, p=.094), there are some interesting trends. With greater risk of gambling problems, people appeared more likely not to seek assistance, and are less likely to seek help from friends. With greater risk of gambling problems people appeared more likely to approach an Organisation about their problems.

Table 13.13. Types of assistance chosen as a function of problem gambling status as indicated by the CPGI.

	Nobody	Friend	"Professional" (Church, GP, Counsellor)	"Organisation" (Venue, Industry Body, Regulatory Body)	Total
Non-Problem	78 (13.3%)	122 (20.9%)	353 (60.3%)	32 (5.5%)	585 (100%)
Low Risk	17 (13.9%)	36 (29.5%)	64 (52.5%)	5 (4.1%)	122 (100%)
Moderate Risk	15 (18.3%)	12 (14.6%)	47 (57.3%)	8 (9.8%)	82 (100%)
Problem Gambler	6 (23.1%)	2 (7.7%)	16 (61.5%)	2 (7.7%)	26 (100%)
Total	116 (14.2%)	172 (21.1%)	480 (58.9%)	47 (5.8%)	815 (100%)

Table 13.13 seemed to indicate a change in who would be approached for assistance, with the development of a gambling problem. As there were some columns that had low expected cell frequencies subsequent analysis examined the sources of help considered relative to the rates at which help was not sought. A chi square test compared the seeking of help from a friend in relation to not seeking help. A significant relationship was observed (χ^2(3df)=8.248, p<.05). Problem gamblers are more likely not to seek assistance, and less likely to seek help from friends.

As there were few individuals that considered seeking help from the church or GPs, these categories were collapsed with Counsellor into a "professional" category. The numbers of individuals considering seeking help from a professional in relation to not seeking help was examined as a function of problem gambling status. There was no relationship between assistance chosen and problem gambling status (χ^2(3df)=2.374, p>.05). Problem gamblers were less likely to seek help, and were no more likely to choose a professional for assistance with a problem.

As few people chose the gaming venue, industry body, or regulatory body as potential sources of assistance, these categories were collapsed into an "organisation" category. The numbers of individuals considering seeking help from an organisation in relation to the rates of not seeking help were examined as a function of problem gambling status. There was no relationship between assistance chosen and problem gambling status (χ^2(3df)=0.693, p>.05). Based upon the present analysis, problem gamblers were less likely to seek help, less likely to consider seeking help from immediate friends, but no more likely to consider approaching professionals or organisations.

Although effects were not significant, Inspection of Table 13.13 gives the indication that people at risk of developing a gambling problem might perhaps be twice as likely to seek assistance from an organisation. Hence participants were asked which government regulatory body they would contact if they had problems with services or content over the internet, mobile phone, radio, TV or pay TV. Table 13.14 considers the nature of organisations selected to be approached for assistance. The ACMA, ACCC and TIO are government organisations that would be able to assist in the event of dispute. The ADMA, AMTA, ASTRA, FTV, IARBA, and IIA are self regulatory bodies.

Table 13.14. Organisations selected as being sources of assistance.

Organisation	ACCC	ACMA	ADMA	AMTA	ASTRA	FTV	IARBA	IIA	TIO	Don't Know	Total
Percent	21.3	9.0	2.6	0.9	3.5	2.9	0.7	0.5	5.9	65.9	100
N	215	91	26	9	35	29	7	5	60	479	1009

Key to organisations:

ACCC = Australian Competition and Consumer Commission.
ACMA = Australian Communications and Media Authority
ADMA = Australian Direct Marketing Association.
AMTA = Australian Mobile Telecommunications Association
ASTRA = Australian subscription television and radio association.
FTV = Free to air television.
IARBA = Independent Australian radio broadcasters association.
IIA = Internet industry association.
TIO = Telecommunications industry ombudsman.

As there were a number of categories with small rates of responding, the data was collapsed over government organisations and self regulatory bodies, and as there problems with cell frequencies, scores on the CPGI were used to categorise people into "No Risk" and "Risk" of developing gambling problems. Analyses were then conducted to determine whether risk of developing gambling problems would influence the choice of organisation approached for assistance (see Table 13.15). Although a relationship between gambling risk and *government organisation* approached significance, it was not significant (χ^2(1df)=2.547, p=.110 corrected for continuity).   Whereas 32.9% (190) of participants who were not at risk nominated a government organisation as a source of possible assistance only 26.6% (57) of participants who were at risk of gambling problems nominated a government organisation as a possible source of assistance (see Table 13.15).

Table 13.15. Source of assistance chosen as a function of risk of a gambling problem: Government bodies.

Government Body to Contact with Problems	Not ACCC, ACMA, TIO	ACCC, ACMA, TIO	Total
No Risk (CPGI)	388 (67.1%)	190 (32.9%)	578
Risk (CPGI)	157 (73.4%)	57 (26.6%)	214
Total	545 (68.8%)	247 (31.2%)	792

There was a significant relationship between risk of a gambling problem and the choice of an *industry body* to approach in the event of a gambling problem (χ^2(1df)=4.143, p=.042, corrected for continuity). Inspection of Table 13.16 implies people at risk of a gambling problem were more likely to name an industry body as a source of assistance if they had a problem with services or content received over the internet, mobile phone, radio, TV or pay TV. People without a gambling problem indicated an industry body as a source of assistance 7.3%, whereas people with a gambling problem indicated an industry body 12.1% of the time (see Table 13.16).

Table 13.16. Source of assistance chosen as a function of risk of a gambling problem: Industry bodies.

Government Body to Contact with Problems	Not ADMA, ASTRA, FTV, IARBA, IIA	ADMA, ASTRA, FTV, IARBA, IIA	Total
No Risk (CPGI)	536 (92.7%)	42 (7.3%)	578
Risk (CPGI)	188 (87.9%)	26 (12.1%)	214
Total	724 (91.4%)	68 (8.6%)	792

There was no relationship between risk of a gambling problem and knowledge of which government organisation to approach if they had a problem (χ^2(1df)= 1.651, p>.05, corrected for continuity). Whereas participants who were not at risk of a gambling problem did not know which government organisation to approach 65.4% of the time, participants

who were at risk of a gambling problem did not know which government organisation to approach 70.6% of the time (see Table 13.17).

Table 13.17. "Don't know" the possible sources of assistance as a function of risk of a gambling problem.

Government Body to Contact with Problems	ACCC, ACMA, ADMA, AMTA, ASTRA, FTV, IARBA, IIA, TIO	Don't Know	Total
No Risk (CPGI)	200 (34.6%)	378 (65.4%)	578
Risk (CPGI)	63 (29.4%)	151 (70.6%)	214
Total	263 (33.2%)	529 (66.8%)	792

13.8 Summary

People reporting problems controlling their gambling and use of technology are interested in electronic access. For instance a problem gambler is far more likely to click on links to information associated with gambling. This implies that *these consumers are more at risk of potential scams*. People using technology are more likely to receive SMS spam, particularly people that have problems controlling their radio listening habits, or have problems controlling their use of the internet or mobile phones. People in receipt of electronic junk mail may be dissatisfied with mechanisms protecting electronic privacy, but dissatisfaction appears to be a function of poorer education and some of the problems people have controlling their technology use. In other words, the less well educated with poorer impulse control seem to be more at risk.

In the event of a dispute, there are differences in the mechanisms sought for assistance. In general the community believes that if a person has a gambling problem arising from traditional sources that do not involve emergent technologies, they should seek assistance from a counsellor or friend. However, the community feels that if a person has a problem with electronic services, then the person is expected to approach the organisation that is responsible for delivering the electronic service that caused the problem in the first place. This is a concern, as the primary problems reported concerning offshore casinos appear to be slow or dishonoured payouts and poor customer service (see also Monaghan, 2009). Indeed, people with a gambling problem were less likely to nominate a friend as a source of assistance, and were more likely to nominate "nobody" as a source of assistance if they developed a problem. Behavioural measures indicate that problem gamblers will need assistance. Compared to those individuals who were not at risk, *Problem gamblers were 17.8 times more likely to click on a link related to gambling*, and 7.5 times more likely to click on a link related to counselling. Indeed if a problem gambler has a problem, they are less likely to seek assistance, and more likely to perceive the industry as a body to approach in the event of a problem with their gambling. There was little evidence that problem gamblers knew which was the appropriate government body to approach in the event they had problems with gambling accessed using emergent technologies.

13.9 References

Ericsson, K.A., & Simon, H.A. (1980). Verbal reports as data. *Psychological Review, 87*, 215-251.

Lund, I. (2008). The population mean and the proportion of frequent gamblers: Is the theory of total consumption valid for gambling? *Journal of Gambling Studies, 24*, 247-256.

Monaghan, S. (2009). Responsible gambling strategies for internet gambling" The theoretical and empirical base of using pop-up messages to encourage self-awareness. *Computers in Human Behavior, 25,* 202-207.

Nisbett, R.E., & Wilson, T.D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84*, 231-259.

Schellinck, T. & Schrans, T. (2004). Identifying problem gamblers at the gambling venue: Finding combinations of high confidence indicators. *Gambling Research,16,* 8-24.

Shaffer, H.J., Peller, A.J., LaPlante, D.A., Nelson, S.E., & LaBrie, R.A. (2010). Toward a paradigm shift in Internet gambling research: From opinion and self-report to actual behavior. *Addiction Research and Theory, 18*(3), 270-283.

14. Age, Gambling and use of Interactive Services

To understand the likely sections of the community that will probably avail themselves of new technologies, a series of analyses were conducted to determine possible predictors of gambling, wagering and interactive services. The primary focus of this analysis was upon age, as access by minors to online services such as gambling can be a concern. Multiple regression was used to determine which of a number of intercorrelated variables was able to make useful contributions to the prediction of a variable of interest (i.e. gambling or use or interactive services). Multiple regression makes a number of assumptions (i.e. linear relationships) and requires that variables be normally distributed. As the distribution of ages was positively skewed in this sample, it was square root transformed in order to satisfy this assumption.

14.1 Betting and Wagering

14.1.1 Races

A multiple regression was conducted to determine which variables could predict betting on races (see Table 14.1). A significant proportion of the variance (5.8%) could be accounted for ($F(10,777)=5.880$, $p<.001$) by the study variables. Male gender ($t(777)=-2.471$, $p=.014$) and a greater risk of problem gambling ($t(777)=6.211$, $p<.001$) predicted greater levels of betting upon races. Although older age has sometimes been linked to levels of problem gambling, age did not emerge as a significant predictor ($t(777)=-0.266$, $p>.05$). When the analysis is repeated with 14 multivariate outliers removed, the significant predictors remain unchanged.

Table 14.1. Predictors of betting on races.

Predictor	B	t	p
Age	-.002	-.266	.790
Income	.000	-.861	.390
Education	-.003	-.659	.510
Gender	-.034	-2.471	.014
ProblemGambler	.052	6.211	.000
TV Problem Use Scale	-.002	-1.267	.206
Radio Problem Use Scale	.001	.774	.439
Internet Problem Use Scale	-.002	-1.860	.063
LandLine Problem Use Scale	.002	1.583	.114
Mobile Phone Problem Use Scale	.000	.316	.752

14.1.1 Sports

A multiple regression was conducted to determine which variables could predict betting on sports (see Table 14.2). A significant proportion of the variance (10.0%) could be accounted for $(F(10,790)=9.864, p<.001)$ by the study variables. Male gender $(t(790)=-3.507, p<.001)$ and a greater risk of problem gambling $(t(790)=8.338, p<.001)$ predicted greater levels of betting upon sports. The negative relationships between the Internet Problem Use Scale and sports betting $(t(790)=-2.256, p=.024)$ suggests that an interest in other technologies may prevent a person from gambling. Betting upon sports is a relatively new phenomenon, but age again did not emerge as a significant predictor $(t(790)=-1.734, p=.083)$. When the analysis is repeated with 9 multivariate outliers removed, the significant predictors remain unchanged.

Table 14.2. Predictors of betting on sports.

Predictor	B	t	p
Age	-.011	-1.734	.083
Income	.000	-1.002	.317
Education	.002	.534	.593
Gender	-.041	-3.507	.000
ProblemGambler	.058	8.338	.000
TV Problem Use Scale	-.001	-.906	.365
Radio Problem Use Scale	.001	.755	.450
Internet Problem Use Scale	-.002	-2.256	.024
LandLine Problem Use Scale	.002	1.898	.058
Mobile Phone Problem Use Scale	-.001	-.695	.488

14.2 Internet Betting and Wagering

14.2.1 Races

Previous questions in the survey had not specifically asked whether wagers were placed using the internet. Hence a multiple regression was conducted to determine which variables could predict the use of the internet to bet on races (see Table 14.3). A significant proportion of the variance (4.2%) could be accounted for $(F(10,787)=4.493, p<.001)$ by the study variables. Problem gambling status $(t(787)=5.421, p<.001)$ predicted greater levels of betting upon races using the internet. A greater reliance upon the landline telephone $(t(787)=1.962, p=.05)$ also predicted greater wagering on races over the internet, presumably because people were off-course punters. People who relied heavily on the television for their entertainment were less likely to wager $(t(787)=-2.813, p<.01)$.

Table 14.3. Predictors of betting on races over the internet.

Predictor	B	t	p
Age	.003	.227	.821
Income	.000	-.729	.466
Education	.008	1.122	.262
Gender	-.031	-1.378	.169
ProblemGambler	.074	5.421	.000
TV Problem Use Scale	-.007	-2.813	.005
Radio Problem Use Scale	-.001	-.615	.539
Internet Problem Use Scale	.000	-.094	.925
LandLine Problem Use Scale	.005	1.962	.050
Mobile Phone Problem Use Scale	.001	.569	.570

If the analysis is repeated with 17 multivariate outliers removed, the only significant predictor of internet betting on races that remains is problem gambling status. Hence as predictors of race betting, the TV Problem Use and Landline Problem Use Scales should be viewed with caution. [As these analyses are potentially focussing upon a minority (i.e. problem gamblers) and other low frequency activities, it may be that eliminating outliers is actually removing the data of interest.]

14.2.2 Sports

The survey specifically asked questions about the use of the internet to place bets on sports. A multiple regression was conducted to determine which variables could predict the use of the internet to bet on sports (see Table 14.4). A significant proportion of the variance (11.5%) could be accounted for ($F_{(10,789)}=11.402$, $p<.001$) by the study variables. Problem gambling status ($t_{(789)}=8.685$, $p<.001$) predicted greater levels of betting upon sports using the internet. People using the internet to bet on sports were young ($t_{(789)}=-3.285$, $p<.001$), male ($t_{(789)}=-2.935$, $p<.01$), and better educated ($t_{(789)}=2.996$, $p<.01$). When the analysis is repeated with 11 multivariate outliers removed, the significant predictors remain unchanged.

Table 14.4. Predictors of betting on sports over the internet.

Predictor	B	t	p
Age	-.039	-3.285	.001
Income	.000	-1.537	.125
Education	.021	2.996	.003
Gender	-.064	-2.935	.003
ProblemGambler	.114	8.685	.000
TV Problem Use Scale	-.003	-1.553	.121
Radio Problem Use Scale	.001	.637	.525
Internet Problem Use Scale	-.002	-1.072	.284
LandLine Problem Use Scale	.003	1.422	.156
Mobile Phone Problem Use Scale	-.001	-.630	.529

14.2.3 Lotto

As this project was devoted to the use of technologies, the survey specifically asked questions about the use of the internet to purchase lotto tickets. A multiple regression was conducted to determine which variables could predict the use of the internet to purchase lotto tickets (see Table 14.5). A significant proportion of the variance (3.2%) could be accounted for ($F(10,785)=3.615$, $p<.001$) by the study variables. People using the internet to purchase lotto tickets were more likely to be problem gamblers ($t(785)=2.931$, $p<.01$), and were more likely to report problems limiting their use of the radio as a form of entertainment ($t(785)=3.250$, $p<.001$).

When this analysis is repeated with 13 multivariate outliers removed, it is no longer possible to predict a significant amount of variance associated with the use of the internet to purchase lotto tickets. [As these analyses are potentially focussing upon a minority (i.e. problem gamblers) and other low frequency activities, it may be that eliminating outliers is actually removing the data of interest.]

Table 14.5. Predictors of purchasing lotto tickets over the internet.

Predictor	B	t	p
Age	.002	.199	.842
Income	.000	-1.459	.145
Education	.003	.587	.557
Gender	-.009	-.595	.552
ProblemGambler	.027	2.931	.003
TV Problem Use Scale	-.003	-1.623	.105
Radio Problem Use Scale	.005	3.250	.001
Internet Problem Use Scale	.001	1.020	.308
LandLine Problem Use Scale	.003	1.780	.075
Mobile Phone Problem Use Scale	-.002	-1.034	.302

14.2.4 Poker

Although of internet poker is of questionable legal status, participants were asked whether people played poker over the internet. A multiple regression was conducted to determine which variables could predict the playing of internet poker (see Table 14.6). A significant proportion of the variance (6.5%) could be accounted for (F(10,788)=6.580, p<.001) by the study variables. People playing poker over the internet were again more likely to be problem gamblers (t(788)=5.191, p<.001), and were more likely to report problems limiting their internet use (t(788)=3.736, p<.001).   Age was not a significant predictor of internet poker play (t(788)=-0.506, p>.05). It is not age, but interest in the internet and gambling, that appears to be the issue when playing internet poker.

When the analysis is repeated with 19 multivariate outliers removed, problem gambling status remains a predictor, but it seems that problem internet use is no longer a significant predictor (t(10,769)=1.864, p=.063). Instead younger age emerges as a predictor (t(10,769)=-2.156, p=.031). As these findings seem unstable, they should be viewed with caution. [As these analyses are potentially focussing upon a minority (i.e. problem gamblers) and other low frequency activities, it may be that eliminating outliers is actually removing the data of interest.]

Table 14.6. Predictors of playing internet poker.

Predictor	B	t	p
Age	-.007	-.506	.613
Income	.000	-.429	.668
Education	-.004	-.431	.666
Gender	-.009	-.342	.733
ProblemGambler	.085	5.191	.000
TV Problem Use Scale	-.003	-1.064	.288
Radio Problem Use Scale	-.001	-.475	.635
Internet Problem Use Scale	.009	3.736	.000
LandLine Problem Use Scale	-.001	-.477	.633
Mobile Phone Problem Use Scale	.004	1.571	.117

14.3 Mobile Phones and Interactive Services

14.3.1 Games

The use of mobile phones to play games may be a precursor of the use of the mobile phone to gamble. Participants were asked whether they used their mobile phone to play games. A multiple regression was conducted to determine which variables could predict the playing of games on mobile phones (see Table 14.7). A significant proportion of the variance (12.3%) could be accounted for (F(10,791)=12.229, p<.001) by the study variables. People who reported playing more games on their mobile phones were more likely to report problems limiting their use of their mobile phones (t(791)=6.117, p<.001), and were more likely to report problems limiting their internet use (t(791)=2.399, p<.05). People who reported problems controlling their landline use were less likely to play games on their mobile phone (t(791)=-2.006, p<.05).   Age was not a significant predictor of game play on mobile phones (t(791)=-1.757, p=.079). Interest in the technology rather than age appears to be the issue when playing games on mobile phones.   When the analysis is repeated with 4 multivariate outliers removed, the significant predictors remain unchanged.

Table 14.7. Predictors of game playing on mobile phones.

Predictor	B	t	p
Age	-.090	-1.757	.079
Income	-.001	-.704	.482
Education	.026	.867	.386
Gender	-.131	-1.381	.168
ProblemGambler	.098	1.713	.087
TV Problem Use Scale	.002	.230	.818
Radio Problem Use Scale	-.011	-1.159	.247
Internet Problem Use Scale	.021	2.399	.017
LandLine Problem Use Scale	-.019	-2.006	.045
Mobile Phone Problem Use Scale	.058	6.117	.000

14.3.2 Competitions

The use of mobile phones to enter competitions could also be a precursor of the use of the mobile phone to gamble. Hence participants were asked whether they used their mobile phone to enter competitions in magazines. A multiple regression was conducted to determine which variables could predict the use of mobile phones to enter competitions (see Table 14.8). A significant proportion of the variance (10.4%) could be accounted for ($F(10,785)=10.264$, $p<.001$) by the study variables. Problem gamblers were more likely to report problems using their mobile phones to enter competitions in magazines ($t(785)=4.265$, $p<.001$). People using SMS to enter magazine competitions were more likely to report problems limiting their internet use ($t(785)=4.022$, $p<.001$), be female ($t(785)=4.471$, $p<.001$), and be less well educated ($t(785)=-2.839$, $p<.01$). Magazine competitions are of interest to problem gamblers, but this is not an activity that appears to attract a specific age range.

If the analysis is repeated with 19 multivariate outliers removed, the significant predictors change. Gender, problem gambling status and problem internet use remain as significant predictors. However education is no longer a significant predictor ($t(766)=-1.467$, $p=.143$), and the problem radio use scale emerges as a significant predictor ($t(766)=2.835$, $p=.005$). As these findings seem unstable, they should be viewed with caution. [As these analyses are potentially focussing upon a minority (i.e. problem gamblers) and other low frequency activities, it may be that eliminating outliers is actually removing the data of interest.]

Table 14.8. Predictors of the use of mobile phones to enter competitions.

Predictor	B	t	p
Age	.032	1.212	.226
Income	-.001	-.761	.447
Education	-.043	-2.839	.005
Gender	.218	4.471	.000
ProblemGambler	.125	4.265	.000
TV Problem Use Scale	-.005	-1.006	.315
Radio Problem Use Scale	.009	1.836	.067
Internet Problem Use Scale	.018	4.022	.000
LandLine Problem Use Scale	-.001	-.179	.858
Mobile Phone Problem Use Scale	.008	1.545	.123

14.3.3 Voting

As impulsivity features in accounts of problem gambling, the potential for immediate interaction may motivate gamblers. Hence participants were asked whether they used their mobile phone to vote (register preferences). As prizes are sometimes offered for voting, this may also encourage voting behaviours. A multiple regression was conducted to determine which variables could predict the use of mobile phones to vote or register preferences (see Table 14.9). A significant proportion of the variance (7.3%) could be accounted for ($F(10,788)=7.307$, $p<.001$) by the study variables. Using SMS to vote or register preferences attracts the interest of problem gamblers ($t(788)=3.687$, $p<.001$), and to a lesser extent people reporting problems controlling their radio ($t(788)=2.607$, $p<.01$), internet ($t(788)=2.171$, $p<.05$) and mobile phone use ($t(788)=2.120$, $p<.05$). Age was not a predictor of voting behaviour.

When the analysis is repeated with 14 multivariate outliers removed, the significant predictors change, with only problem gambling status ($t(774)=2.219$, $p=.027$) and problem radio use ($t(774)=2.2555$, $p=.011$) remaining as significant predictors. Therefore the other predictors (problem mobile phone use and problem internet use) probably need to be viewed with caution.

Table 14.9. Predictors of the use of mobile phones to vote or register preferences.

Predictor	B	t	p
Age	.006	.828	.408
Income	-000	-.445	.656
Education	-.003	-.787	.432
Gender	.005	.408	.684
ProblemGambler	.027	3.687	.000
TV Problem Use Scale	.000	-.212	.832
Radio Problem Use Scale	.003	2.607	.009
Internet Problem Use Scale	.002	2.171	.030
LandLine Problem Use Scale	.001	.640	.522
Mobile Phone Problem Use Scale	.003	2.120	.034

14.3.4 Calculations

Another form of interactivity involves the use of calculation services. Hence participants were asked whether they used their mobile phone for calculations (e.g. sexual compatibility, blood alcohol concentrations).   A multiple regression was conducted to determine which variables could predict the use of calculation services offered to their mobile phones (see Table 14.10). A significant proportion of the variance (8.0%) could be accounted for (F(10,784)=7.937, p<.001) by the study variables. Using a mobile phone to access calculation services attracted the interest of males (t(784)= -3.643, p<.001), problem gamblers (t(784)=4.971, p<.001), and to a lesser extent people of lower income (t(784)=-2.806, p<.01) and people reporting problems limiting their radio use (t(784)=2.518, p<.05). Although television commercials emphasise a variety of dubious baby name, sexual compatibility services and bogus answers to questions, there are also a number of tipping websites that offer SMS notifications that may be contributing to these relationships (e.g. http://www.puntersparadise.com.au/).

If the analysis is repeated with 16 multivariate outliers removed, it is no longer possible to predict the use of calculation services, hence these findings should be viewed with caution. [As these analyses are potentially focussing upon a minority (i.e. problem gamblers) and other low frequency activities, it may be that eliminating outliers is actually removing the data of interest.]

Table 14.10. Predictors of the use of calculation services offered to mobile phones.

Predictor	B	t	p
Age	-.014	-1.781	.075
Income	-.001	-2.806	.005
Education	.008	1.779	.076
Gender	-.053	-3.643	.000
ProblemGambler	.043	4.971	.000
TV Problem Use Scale	.000	-.264	.792
Radio Problem Use Scale	.004	2.518	.012
Internet Problem Use Scale	-.002	-1.199	.231
LandLine Problem Use Scale	.003	1.900	.058
Mobile Phone Problem Use Scale	.001	.388	.698

14.3.5 *Premium SMS and Mailing Lists*

Gambling typically involves the transfer of monies. The method of transferring funds over the mobile phone is by premium SMS messages that cost 55c or more. Hence the survey asked whether participants were engaged in funds transfers using their mobile phones. A multiple regression was conducted to determine which variables could predict funds transfers using premium SMS on their mobile phones (see Table 14.11). A significant proportion of the variance (11.3%) could be accounted for $(F(10,790)=11.150, p<.001)$ by the study variables. Funds transfers using premium SMS were more likely to be reported by older $(t(790)=2.894, p<.01)$, females $(t(790)=4.401, p<.001)$, problem gamblers $(t(790)= 3.703, p<.001)$, and people that report problems controlling their internet $(t(790)=4.337, p<.001)$ and mobile phone use $(t(790)=2.696, p<.01)$.

If the analysis is repeated with 15 multivariate outliers removed, most of the significant predictors remain unchanged (age, gender, problem gambler status, internet use, mobile phone use), but education is no longer a significant predictor $(t(775)=-1.592, p=.112)$ and problem radio use emerges as a predictor $(t(775)=2.131, p=.033)$. Hence these latter two variables should be treated with caution.

Table 14.11. Predictors of the use of premium SMS on mobile phones.

Predictor	B	t	p
Age	.079	2.894	.004
Income	.000	-.643	.521
Education	-.047	-2.943	.003
Gender	.223	4.401	.000
ProblemGambler	.113	3.703	.000
TV Problem Use Scale	-.002	-.307	.759
Radio Problem Use Scale	.008	1.545	.123
Internet Problem Use Scale	.020	4.337	.000
LandLine Problem Use Scale	-.005	-.907	.365
Mobile Phone Problem Use Scale	.014	2.696	.007

Premium SMS tends to be used by SMS mailing lists to generate "entry blanks". These are competition entry forms that can cost between 2 and 5 dollars to receive. Some of these entry blanks are for competitions involving prizes. Hence the survey asked people to report how often they were contacted by SMS mailing lists. A multiple regression was conducted to determine which variables could predict contact by SMS mailing lists (see Table 14.12). A significant proportion of the variance (11.7%) could be accounted for $(F(10,791)=11.647, p<.001)$ by the study variables. Higher levels of contact by SMS mailing lists were more likely to be reported by better educated $(t(791)=2.949, p<.01)$, problem gamblers $(t(791)= 4.587, p<.001)$, and people that report problems controlling their mobile phone $(t(791)=4.500, p<.001)$ and radio use $(t(791)=2.560, p<.05)$. People who reported more involvement with their landline were less likely to report contact from SMS mailing lists $(t(791)=-2.007, p<.05)$. When the analysis is repeated with 7 multivariate outliers removed, most of the significant predictors remain unchanged, but the landline problem use scale is no longer a significant predictor and should be viewed with caution.

Table 14.12. Predictors of contact by SMS mailing lists.

Predictor	B	t	p
Age	.015	1.627	.104
Income	.000	-1.681	.093
Education	.016	2.949	.003
Gender	-.006	-.347	.728
ProblemGambler	.046	4.587	.000
TV Problem Use Scale	.002	1.082	.279
Radio Problem Use Scale	.004	2.560	.011
Internet Problem Use Scale	.002	1.469	.142
LandLine Problem Use Scale	-.003	-2.007	.045
Mobile Phone Problem Use Scale	.008	4.500	.000

14.4 Age and involvement in technologies

This section considered age as a possible predictor of interest in interactive services. Age on its own was not a good predictor of interest in interactive services. Problem gambling status was a better predictor of interest in gambling activities. A difficulty controlling one's use of a specific technology tended to be a better predictor of use of the internet or mobile services than age. To understand how this might arise, age (square root transformed) was correlated with the problem use scales previously shown to predict involvement in technology. As may be seen in Table 14.13, younger individuals were more involved with mobile, internet, and to a lesser extent television. As age accounted for lower proportions of variance in the previous multiple regression analyses (if at all), it would appear that involvement in a particular technology was a better predictor of use of a specific service, than age. Van Dijk, Peters, and Ebbers (2008) have also found that an intention to use the technology was a better predictor than demographic variables such as age.

	TVPUS	RPUS	IPUS	LPUS	MPUS
Correlation	-.153[***]	-.021	-.288[***]	-.046	-.448[***]
Sig	.000	.490	.000	.139	.000
N	1070	1052	1035	1019	1002

*p<.05, **p<.01, ***p<.001

14.5 Summary

A stated concern associated with the use of emergent technologies to support gambling, is that these technologies specifically attract younger individuals that may be minors. Although technically it may be difficult to determine the age of a consumer that is using a specific computing device, it is not a truism that younger age automatically equates with a use of technology and interactive services. We found that reported problems controlling use of technologies accounted for gambling and the use of specific interactive services better than simple demographic variables. This is not that surprising.   It is like saying that political party membership is more likely to predict attendance at political rallies than socio-economic status. Interest is a more specific predictor of technology use than age (Van Dijk, Peters, & Ebbers, 2008).

In the present data, relationships between age and the use of interactive services were few. ***Younger*** individuals were more likely to wager on sports using the internet. ***Older*** individuals were more likely to be using premium SMS as a method of funds transfer. Interest and involvement in technology appears to be a better predictor of the use of interactive services than age. Indeed in some cases a specfic interactive service may actually appeal to an older section of the community. The difficulty finding relationships between age and interactive services would appear to arise because younger individuals are more interested in specific technologies (i.e. TV, internet, mobile phones). In other words, it is not so much age, but a person's impulse control that is the issue with these technologies.

14.6 References

Van Dijk, J.A.G.M., Peters, O., & Ebbers, W. (2008). Explaining the acceptance and use of government internet services: A multivariate analysis of 2006 survey data in the Netherlands. *Government Information Quarterly, 25,* 379-399.

15. Conclusions – Survey data

Emergent technology has the potential to place an electronic gaming terminal in everybody's pockets (as mobile phone) and living rooms (as interactive television). It is unclear whether this will create new markets of consumers, or cater to existing gamblers (Phillips, Saling, & Blaszczynski, 2008). The present survey sought to understand factors influencing the use of a variety of interactive services. Gamblers were interested in gambling, and activities that resembled gambling. At present, people who devote more time to a specific form of entertainment are likely to have less time to devote to an activity such as gambling. Nevertheless there were areas where the interests of gamblers intersected with those of people who were preoccupied with a particular technology for entertainment purposes.

The present data suggests that one of the factors predicting use of interactive services is problems of impulse control since it indicates interactive services tend to be used by people who may be at risk of developing gambling problems because of elevated traits of impulsivity Possibly as a consequence of impulse control problems, people are contacted by mailing lists and unsubscribe more often.

It has been previously demonstrated that self-reported problems controlling use of technology can predict levels of internet (Armstrong, Phillips, & Saling, 2000) and mobile phone use (Bianchi & Phillips, 2005). Nevertheless it is somewhat surprising that a risk of developing a gambling problem can also predicts the use of interactive services. The present data indicates that interactivity is greater when incentives (e.g., cash prizes) are involved, and given that these interactive activities only involve low levels of skill (e.g., SMS cash trivia) the resemblances between gambling may not be accidental (Griffiths, 2007). As premium SMS services offer a method of funds transfer, there are a number of low skill interactions in which funds are transferred for a chance of winning a cash prize. The correlations with problem gambling scales in this Australian sample suggest that a proportion of consumers are responding to some of these interactive services as if they are a form of gambling (Ofcom, 2006).

The present data suggest that gamblers and people with problems controlling their technology use are more interested in access to electronic services, and this is supported by behavioural data. There are indications that this activity attracts more SPAM, attempts to unsubscribe, and dissatisfaction with current levels of consumer protection. The potential problems associated with careless use of such technology can be listed on sites such as SCAM WATCH (http://www.scamwatch.gov.au/content/index.phtml/itemId/693900). People in receipt of electronic junk mail may be dissatisfied with mechanisms protecting electronic privacy, but dissatisfaction appears to be a function of poorer education and some of the problems people have controlling their technology use. Con men sometimes claim that they do not con honest people (Henderson, 1985), and the present data does offer some slight evidence to support that position, in that gamblers and people with poorer impulse control seem to be more susceptible to SMS mailing lists. Although Henderson (1985) suggests that the best way to avoid being conned is not to listen to conmen, it should be a concern that up to 95% of email traffic can be SPAM intent on criminal nuisance, thus generating considerable potential to erode consumer confidence. Some experts have advocated imposing message charges on the senders of emails for this reason (e.g. Kraut, Sunder, Telang, & Morris, 2005).

Although some individuals with problems of impulse control may be at risk of these emerging technologies, it is hard to recommend blocking gaming innovations simply upon the basis of putative effects that only explain a small proportion of the variance. Nonetheless, this is a reason to argue for organisations offering these services to have mechanisms in place to assist distressed consumers. The present data indicate that community expectations are for the provider of electronic services to have mechanisms in place to assist consumers in the event that problems arise.

Technology has created loopholes allowing off-shore operators to operate in other jurisdictions (Eadington, 2004). In addition, some potentially interactive technologies are being used to implement activities that resemble gambling by stealth. Unfortunately where gambling-like activities are being promoted in unregulated or poorly controlled environments, then there is an increased risk to the consumer (Eadington, 2004). In the case of emerging technologies and gambling, there is the suggestion that every mobile phone or interactive television could provide access to gambling 24 hours a day 7 days a week. Given the potential pervasiveness of such devices there is a need to determine relationships between availability and degree of potential harm (Abbott & Clarke, 2007). If availability is linked to harm, then it is possible that community controls can reduce potential risk (Abbott, 2006; Shaffer, 2005), but such controls will need to be implemented for the next cohort of potential consumers.

As problem gamblers are more likely to be upset following a gambling session (Brown, Rodda, & Phillips, 2004) it is likely that there will be an increased need for online assistance or consumer protection measures. However, it is unclear whether poorly regulated operators will make such provisions available, or readily accessible 24 hours a day 7 days a week to distressed and possible irrational consumers (Monaghan, 2009). Automated warnings are under consideration (Cloutier, Ladouceur, & Sévigny, 2006; Monaghan & Blaszczynski, 2007) to support consumers, and of course there is an existing system of phone counselling services (e.g., G-line). It is not yet clear whether online services will be adequate to support disturbed online consumers (Rochlen, Zack, & Speyer, 2004).

The ACCC or ACMA have prosecuted a number of mailing list scams involving cold calling and premium SMS. In a poorly regulated environment the fact that up to 95% of messages can be SPAM intent on criminal nuisance has the potential to erode consumer confidence. At present the conduct of online casino gaming tends to be limited to poorly regulated off-shore operators (Eadington, 2004) and allegations of impropriety are not uncommon. Amongst consumer complaints are poor customer service and delayed or dishonoured payments. If the potential for interactivity is currently attracting those individuals with poorer impulse control 24 hours a day, 7 days a week, there is potentially concern that it will erode consumer trust for more legitimate applications (Horst, Kuttschreuter, & Gutteling, 2007; Owens, 2007). It remains to be seen whether mechanisms such as Blacklist filters (ACMA, 2009) and constraints placed upon funds transfer (US Government Accounting Office, 2002) can restrict illegal operators.

15. 1 References

Abbott, M. (2006). Do EGMs and problem gambling go together like a horse and carriage? *Gambling Research, 18*, 7-38.

Abbott, M.W., & Clarke, D. (2007). Prospective problem gambling research: Contribution and potential. *International Gambling studies, 7*, 123-144.

ACMA. (2006-2007). Australian Communications and Media Authority. Communications Report.

ACMA. (2009). Developments in internet filtering technologies and other measures for promoting online safety.   Downloaded 27th April 2009 from http://www.acma.gov.au/webwr/_assets/main/lib310554/developments_in_internet_fi lters_2ndreport.pdf.

Armstrong, L., Phillips, J.G., & Saling, L.L. (2000). Potential determinants of heavier internet usage. *International Journal of Human Computer Studies, 53*, 537-550.

Bianchi, A., & Phillips, J.G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology & Behavior, 8*, 39-51.

Brown, S.L., Rodda, S. & Phillips, J.G. (2004). Differences between Problem and non-problem gamblers in subjective arousal and affective valence amongst Electronic Gaming Machine players. *Addictive Behaviors, 29*, 1863-1867.

Cloutier, M., Ladouceur, R., & Sévigny, S. (2006). Responsible gambling tools" Pop-up messages and pauses on video lottery terminals. *The Journal of Psychology, 140*, 434-438.

Eadington, W.R. (2004). The future of online gambling in the United States and elsewhere. *Journal of Public Policy & Marketing, 23*, 214-219.

Griffiths, M.D. (2003). Internet gambling: Issues, concerns and recommendations. *CyberPsychology & Behavior,* 6, 557-568.

Griffiths, M. (2007). Interactive television quizzes as gambling: A cause for concern? *Journal of Gambling Issues, 20*, 269-76.

Henderson, M.A. (1985). *How con games work.* Secaucus, NJ: Citadel Press.

Horst, M., Kuttschreuter, M., & Gutteling, J.M. (2007). Perceived usefulness, personal experiences, risk perception and trust as determinants of adoption of e-government services in The Netherlands. *Computers in Human Behavior, 23*, 1838-1852.

House of Commons Culture, Media and Sport Select Committee. Call TV Quizshows. 3rd Report. Printed 17 January 2007. Retrieved 3 October, 2008 from http://www.publications.parliament.uk/pa/cm200607/cmselect/cmcumeds/72/7202.ht m

Kraut, R.E., Sunder, S., Telang, R., & Morris, J. (2005). Pricing electronic mail to solve the problem of spam. *Human Computer Interaction, 20*, 195-223.

Monaghan, S. (2009). Responsible gambling strategies for internet gambling" The theoretical and empirical base of using pop-up messages to encourage self-awareness. *Computers in Human Behavior, 25,* 202-207.

Monaghan, S. & Blaszczynski, A. (2007). Recall of electronic gaming machine signs: A static versus a dynamic mode of presentation. *Journal of Gambling Issues, 20*, 253-267.

Ofcom. (2006). Participation TV: How should it be regulated ? Issues Paper. Available at: http://www.ofcom.org.uk/consult/condocs/participation/

Owens, M.D.jr. (2006). If you can't beat 'em, will they let you join? What American states can offer to attract internet gambling operators. *Gaming Law Review, 10*, 26-32.

Phillips, J.G., Saling, L., & Blaszczynski, A. (2008). The psychology of mobile phone use and misuse. In A.C. Harper & R.V. Buress (Eds.), *Mobile Telephones: Networks, Applications, and Performance.* New York, Nova Science Publishers, 191-210.

Rochlen, A.B., Zack, J.S., & Speyer, C. (2004). Online therapy: Review of relevant definitions, debates, and current empirical support. *Journal of Clinical Psychology, 60*, 269-283.

Shaffer, H.J. (2005). From disabling to enabling the public interest: natural transitions from gambling exposure to adaptation and self-regulation. *Addiction, 100*, 1226-1239.

US Government Accounting Office (2002). Internet gambling: An overview of the issues. Downloaded 24th April 2009 from http://www.gao.gov/new.items/d0389.pdf

16. Experimentation

16.1 Computer Mediation of Gambling- Experiment 1

Attempts by regulators to control gaming have hitherto focused upon restricting advertising and access to electronic gaming machines. However, technological developments are now enabling a variety of web capable devices with sufficient computing power to support gambling applications (Griffiths, 2003; 2007; Parke & Griffiths, 2004). As a variety of computing devices are developing these converging capabilities, this means that it is technically possible with suitable connectivity for people to gamble on their personal computers, laptops, mobile phones, and televisions. To better understand consumer preferences for offline (Thomas, Allen, & Phillips, 2009) over online forms of gambling (Wood, Williams, & Lawton, 2007) there is thus a need to understand issues influencing gambling experiences on electronic devices.

Gambling is essentially a social contract in which two parties agree to transfer funds on the basis of the outcome of a chance event or a competition involving low levels of skill. Gambling online can be considered to involve a number of distinct stages (Toneguzzo, 1997) associated with the transmission of distinct messages. A proposition that gambling is possible needs to be made available electronically by an organisation. The individual then accesses the electronic site and stakes a wager on a chance outcome. The outcome of this wager is then relayed by the organisation making the proposition, or a third party. Based on the outcome, the organisation hosting the proposition resolves the gamble by transferring funds. Additional messages may be transmitted if dispute arises. As each of these stages requires computer-mediated transmission of messages, it is important to understand the effects of computer mediation upon wagering behaviours.

Games and gambling rely upon social contracts, but the unregulated use of technology potentially puts the consumer at risk, and compromises the activities of responsible operators (Eadington, 2004). Criminals are historically known to have relied on the ability to interfere with a transmitted signal in order to deliberately mislead punters for financial gain (Henderson, 1985). As technology developed to support gambling across state lines, scams were implemented to take advantage of the activity (Anatomy of a Con, 2008), and laws were implemented (i.e., Wire Transfer Act) to control illegal activity. Hence it should come as no surprise that the internet poses potential concerns for consumers (see http://www.acma.gov.au/WEB/STANDARD/pc=PC_310692) and that there are complaints about online gaming sites (e.g., http://wizardofodds.com/casinos/badcasinos.html).

The psychological distance imposed by computer-mediated communications (Phillips, Saling, & Blaszczynski, 2008) can potentially effect gambling behavior for a number of reasons that will be addressed in turn: 1) Usability - the interface may be clumsy, leading to problems accessing the gambling activity;   2) Involvement - the interface may disrupt levels of involvement leading to reductions in gambling activity; 3) Anonymity – problems identifying operators may lead to problems of trust; and 4) Illusion of control - computer mediation may influence any erroneous cognitions supporting the gambling activity.

16.1.1 Usability

Wilson (2008) reviews the early history of computer games. Early pioneers such as Baer (Wilson, 2008, p. 106) had problems because the initial games developed were too

complicated (Wilson, 2008, p. 109). By contrast Bushnell succeeded with Pong on Atari, because he developed a game so easy that everyone already knew how to play it (Wilson, 2008, p. 109). Poorly designed interfaces are cumbersome, effortful and can detract from user experience (Baber, 1997). As a competitor's website may only be another click away (Nielsen, 2000), usability can be an important factor determining use of a website. In a casino, placing a bet is as simple as dropping a chip on a layout, but when using a computer, webpages need to be negotiated and cursor control devices need to be manipulated. As usability will typically be less when gambling using a computer than the opportunities presented in real life, it is possible that gambling over the internet or mobile phone will be associated with reduced wagering behavior.

16.1.2 Involvement

For game designers, the addictiveness of a game is often cited as a measure of success (Goggin, 2008). The potential for immersion or "deep play" is a factor sometimes linked to the success of games. Csikszentmihalyi and Csikszentmihalyi (1988) have coined the term "flow" to refer to this potential for internet use to be absorbing. Unfortunately, the fidelity of the interface, as influenced by factors such as screen size and refresh rate may detract from the degree of involvement possible, and thus influence the gambling experience. The previously mentioned clumsiness of the interface may also detract from involvement, as would frequent interrupts and requests for confirmation (see Whitworth, 2005; Yampolskiy & Govindaraju, 2008). For such reasons it is to be expected that preference for, and confidence in a gambling activity will vary as a function of the fidelity of the gambling experience offered.

16.1.3 Anonymity

When people remain anonymous, they are prone to disinhibited behaviour over the internet (Suler, 2004). People are more likely to tell lies or say damaging truths when communications are mediated by a computer (Whitty & Carville, 2008). Indeed, the absence of nonverbal cues may make it more difficult to interpret people's behavior and detect lying (Phillips, Saling, & Blaszczynski, 2008). As games involve a social contract, people may be less willing to interact with unknown parties, as there may be less potential to take action in the advent of wrong doing (Kücklich, 2008). Hence computer mediation of gambling may disrupt trust and willingness to wager.

16.1.4 Illusion of Control

Gambling behaviour appears to be supported by a variety of erroneous cognitions (Walker, 1992). An illusion of control has been defined as an expectancy of a probability of personal success that is inappropriately higher than the objective probability would warrant. Langer (1975) suggested that such erroneous beliefs arose from situations that have elements in common with those normally associated with the opportunity to exert skill such as competition, choice, familiarity, and involvement. For instance, Phillips and Amrhein (1989) observed a greater willingness to wager when participants controlled their own cards, than when they were betting on an algorithm (even though the actual odds of winning did not vary).

An illusion of control can be demonstrated to exist when people are present physically or at a distance over the internet (Matute, Vadillo, Vegas, & Blanco, 2007). However the

physical presence of the gambler could be considered to afford an greater opportunity to enforce the social contract associated with the gambling activity (Kücklich, 2008) over that potential to enforce a social contract that would be available at a distance over the internet.

Computer mediation of communication during gambling also has some other distinct characteristics. Not only does communication technology have the potential to overcome limitations of distance, but it can also overcome limitations of time such that messages can be recorded and referred to later. This allows convenience of access, but the time delay poses issues for consumers of gambling products where one party knows an outcome and the other does not.

The Amazing Johnathan (1997, p. 23) describes a practical joke involving the prerecording of quiz shows, and the subsequent viewing of the prerecorded show with victims. As he has prerecorded the quiz show The Amazing Jonathan can call out the correct answers before the questions are asked. He uses a similar procedure to convince others that he has won the lottery (The Amazing Johnathan, 1997, p. 34). Although these examples were documented as practical jokes, quiz shows use prerecorded formats and can be used to present some forms of gambling (e.g., Bingo) (see http:// kevmarl.wordpress.com/2007/10/22/sevens-national-bingo-night-isnt-actually-a-bingo-night-at-all/). Hence the use of recordings allows for some individuals to be aware of outcomes.

As the use of recordings demonstrates that there is a potential for some people to anticipate the outcomes, it is worthwhile to revisit the actual nature of the illusion of control. Presson and Bennassi (1996) performed a meta-analysis of 53 experiments over 29 studies and compared the relative strength of effects of illusion of control. Larger effect sizes were found in experiments that measured participants' perceptions of their ability to *predict* outcomes as opposed to participants' perception of ability to *control* outcomes. Hence the illusion of control may be an illusion of prediction or anticipation, rather than that of control. This is important, as information supporting predictive processes can be manipulated. A variety of organisations supply decisional support to gamblers in the terms of strategies and form guides (http://www.tipster.com.au/). Indeed, an increased willingness to wager can be observed when decisional support is provided (O'Hare, Phillips, & Moss, 2009).

16.1.5 *Roulette*

Within casinos the game of roulette is currently offered as a live game, with punters being collocated with and placing bets on a physical layout serviced by a croupier. Roulette is offered in a variety of other forms. Roulette can also be televised, such that punters place bets on a computer terminal with the outcome of the spin of a physical wheel being transmitted by a videolink. In addition, another form of roulette can also be offered through computer terminals with computer generated images of a roulette wheel displaying the outcome. Hence the game of roulette offers considerable ecological validity as a method of comparing gambling over a variety of media.

Unlike some other forms of gambling, roulette offers a variety of odds and combinations of bets (Wagenaar, 1988). Although number bets have the same expected values, the standard deviation of outcomes varies with betting strategy. Larger winning outcomes can be obtained by a smaller number of risky bets, whilst incurring larger losses (Wagenaar, 1988, p. 50). Nevertheless, players prefer to avoid large losses and remain in the game for as long as possible; hence some players place more bets covering multiple numbers

on the roulette layout (Wagenaar, 1988). Placing a larger number of lower risk bets increases the likelihood of smaller wins, but reduces the standard deviation of outcomes, and the likelihood of larger wins (Wagenaar, 1988). Roulette therefore offers a gradation of risk for players, and thus may also be sensitive to differing strategies of bet placements.

Casinos monitor the numbers spun during roulette to determine whether the wheel is unbalanced. As these numbers are recorded, decisional support is sometimes supplied to roulette players as a list of previously spun numbers. This assists players to employ their personalised decision strategies, whether they be playing sections of the wheel, plastering the layout, or following even chances.

Hence the game of roulette offers a number of ecologically valid means of varying the conduct of the game, the presence of the gambler and decisional support, whilst monitoring changes in wagering strategies. The computer mediation of results of gambling outcomes may increase the psychological distance and reduce the opportunity for these gambling related erroneous cognitions to operate, thus reducing the willingness to engage in computer-mediated forms of gambling. Being asked to wager on a prerecorded outcome may influence participants' perceptions of the predictability of the outcome. Wagering on outcomes at a distance may interfere with perceived control (or at least the perception that the social contract can be enforced (Kücklich, 2008). Provision of additional information may determine the extent to which wagering is supported by erroneous cognitions.

16.2 Method

16.2.1 Participants
A group of 24 university students (19 males and 5 females) with a mean age of 23.21 years (SD=6.35) completed the experimental study. Participants responded to an advertisement posted in the university newspaper. Participants were paid for the time taken to complete the study ($A 6/ hour), and were informed that at the completion of the study if they were one of the top two scorers they would receive an Apple iPod Classic (120GB).

Participants were asked about the highest level of education that they had obtained, and about their gambling behaviour.   Participants also completed the Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (CPGI) (Ferris & Wynne, 2001).   On the PGSI participants had mean scores of 1.28 (SD=1.99), with 54.2% of participants considered to be non-problem gamblers, 25% considered to be low-risk, and 20.9% being at moderate risk of developing gambling problems. There was no difference in PGSI score between the group provided the decision aid (M=1.25, SE=0.52) and the group not provided the decision aid (M=1.33, SE=0.67) (t(22)=0.098, p>.05).

16.2.2 Apparatus and Task
The PGSI, a subset of items from the CPGI (Ferris & Wynne, 2001) was used to assess gambling behaviour in the past 12 months. The PSGI was developed for use with a general community sample rather than a clinical population (Brooker et al., 2009; Holtgraves, 2009) and consists of nine-items each scored on a Likert-type scale (0=never, 1=sometimes, 2=most of the time, 3=almost always) (Ferris & Wynne, 2001). The items address *problem gambling behaviours* including betting more than a person can afford to lose and chasing losses, and *adverse consequences* resulting from gambling, including feelings of guilt about

gambling, and having their gambling being criticised by others (Holtgraves, 2009). Participants are categorized as: non-gambler, non-problem gambler; low-risk gambler; moderate risk gambler and high risk gambler (Svetieva & Walker, 2008), with the instrument demonstrating good reliability (Cronbach's alpha = .84) and test-retest reliability (r=.78) (Ferris & Wynne, 2001).

The roulette game was played on a Pentium 4 IBM compatible Personal Computer using custom written software that recorded wagering patterns and timed responses using assembly code. The software also displayed a layout for the computerised Roulette that resembled the Roulette layout displayed in casinos except there was no provision for betting on odds/evens or red/black. A variety of paraphernalia associated with roulette were provided, namely a picture of the wheel, a card listing types of bets and odds, and paper and pencil for the player's use.

A short tone signalled the beginning of each bet followed by the visual message "Place your Bets" appearing on the screen. Although participants had an unlimited number of "points" to wager, they were restricted to wagering a maximum of 9 points on any one bet. Participants used the keyboard to input their wager as well as the location of that wager. Only recognised call bets (i.e. bets legitimate to roulette with the exception of, in this case, the inability to bet on odds/evens, red/black or the corner bet 0-3 paying 8-1) were accepted by the program. Once a wager and a recognised call bet were entered the payout for that wager was displayed onscreen e.g. "Pays 35-1" (for a straight-up bet). Hence there was provision to place bets at a variety of odds, namely 1-1, 2-1, 5-1, 8-1, 11-1, 17-1, 35-1.

Participants had the opportunity to place up to 15 separate bets before the roulette wheel was spun. Time pressure, as would be found in a casino, was applied by allowing participants only 10 seconds to register their wager for each bet before a null bet was recorded by the program. The amounts wagered and the numbers wagered upon were displayed on the screen. In addition, numbers wagered upon changed colour in the layout display giving participants a visual cue to numbers they had already bet on.

Once participants had placed their bets and specified both the amount wagered and the location of the wager for each bet, a roulette wheel was used to provide a winning number. The wheel, manufactured by Dal Rossi of Italy, was 22 cm in diameter and of the French style in that it had one green '0' but no '00'. The winning number was provided by 3 different conditions: *Collocated*, where the wheel was spun by an experimenter in the same room as the participant*; Video-link*, where the participant used Marratech® software to watch a live spin of the wheel located in another room via a full screen video and audio link; and a **Pre-recorded video** condition, where a pre-recording of a wheel spin was shown to the participant on a computer terminal as a full screen video image. To randomise outcomes, seven "sets" of 10 video files were produced and participants were assigned a set at random.

The wheel was spun a total of 10 times for each condition resulting in a total of 30 spins and allowing participants a maximum of 450 bets. At the conclusion of each spin participants were informed of the result and asked to verify it before the winning number was inputted into the computer program by the researcher. An on-screen message including the participants wager on the number spun and the payout was displayed as was a running tally of that participant's winnings/losses to that time.

Participants were divided into 2 groups with half (i.e.12 participants) receiving no decisional support, whilst the other half (i.e. 12 participants) received decisional support. Decisional support was provided in the form of a continuously updated list of the previous 10 winning numbers. That list was prominently located within the layout display and was also drawn to the attention of participants before embarking on the experiment by the researcher.

16.2.3 Procedure

The experiment was conducted in a laboratory within the university. Participants first answered a series of questions aimed at collecting demographic information (e.g. gender, age, highest level of education) before being asked how often they played the game of roulette (an indicator of their level of experience with that game) and how much they believed skill influenced the outcome (an indicator of their belief they could control the outcome). Participants then completed the nine-item PGSI before having the three experimental conditions explained to them. That explanation emphasised all winning numbers would be "honestly" obtained in all three conditions i.e. that no bias or deception was involved in obtaining the winning numbers for any condition.

Subsequently participants were introduced to the proprietary software and shown how to use it. Where appropriate, participants were also shown where the decision-aid appeared on the monitor and what it represented. A practice session followed in which participants familiarised themselves with the software, how to place various bets and the odds associated with those bets. Winning numbers were obtained from a dedicated set of pre-recorded "practice" videos of the wheel. The practice session continued until participants indicated they felt confident enough with the apparatus and task to undertake the experiment.

The experimenter informed participants that they should attempt to win as many points as possible and showed them the incentive for doing so (an Apple iPod). Participants then completed 10 spins of the wheel for each of the three conditions making a total of 30 spins overall. Participants could place a maximum of 15 bets/spin.

Before commencing a new condition participants were asked to indicate on a 5-point Likert scale how confident they felt about winning in that condition. (0=not very confident, 5=very confident). Experimental conditions were separated by an approximately 2 minute break to set up the next condition and provide a short rest interval. The order of presentation of conditions involved use of a Latin Square to control for any carryover effects.

The computer software recorded the wagering behaviour of participants including the number of bets made, their location and the associated degree of risk (see section 16.2.4 below) for each spin.

At the conclusion of the experiment participants were asked which condition they preferred most, and which they preferred least before being debriefed about the negative expected outcome associated with all forms of gambling in the long term.

16.2.4 Design and Analysis

The experiment was a 3x2 Location (Collocated, Videolinked, Pre-recorded) by Decisional Support (previous numbers supplied, not supplied) design. To test decision-aid influence, only half the participants' received this advice and wagering behaviour was

compared to those who did not receive the advice. Bet sizes are normally used as an index of player confidence and can be used to compare scores between the three location conditions. However, wagering is a complex proposition in roulette and there are a number of ways in which the preferred risk can be quantified (Wagenaar, 1988). Wagering can be quantified in terms of the number of chips placed, and the proportion of the layout that is covered, but Wagenaar (1988) also used the mathematically calculated standard deviation of outcome when interpreting wagering patterns. As a measure of potential outcome and preferred risk, we analysed the average payout that would be associated with the bets placed. For instance, if a participant used all corner bets paying 8-1, the average potential outcome and the preferred risk would be 8. If a participant used all split bets paying 17-1, the average potential outcome and prefered risk would be 17. Data were analysed using separate mixed model 3x2 analyses of variance with repeated measures on the Location factor.

16.3 Results

After practice, but before commencing wagering, participants were asked to indicate on a 5-point Likert scale how confident they were about winning in each condition. The effect of Location approached significance ($F(2,44)=3.171$, $p=.052$, $\eta^2=.13$). People tended to be more confident when presented with the collocated condition (M=2.58, SE=0.25) rather than the videolinked (M=2.54, SE=0.22) or the pre-recorded (M=2.13, SE=0.21) conditions. There was no effect of Decisional Support ($F(1,22)=0.020$, $p>.05$, $\eta^2=.00$) upon people's confidence.

The number of chips placed can serve as an index of consumer confidence. Hence the mean number of bets placed per spin was examined (see Table 1). There was no effect of Location upon the mean number of bets placed ($F(2,44)=1.378$, $p>.05$, $\eta^2=.06$), nor was there an effect for Decisional Support upon the mean number of bets placed ($F(1,22)=1.340$, $p>.05$, $\eta^2=.06$). Although there was no effect upon the numbers of chips placed, this is only one index of the amount of risk the participant was willing to take.

Table 15.1. Mean wagers as a function of computer-mediated communication (standard errors in brackets).

	Collocated	Videolinked	Prerecorded
Points bet	22.746 (4.095)	25.471 (4.273)	27.746 (4.167)
Numbers covered	17.704 (1.386)	18.967 (1.441)	16.946 (1.661)
Payouts sought	48.862 (9.238)	48.675 (17.830)	65.567 (10.049)

The mean number of numbers covered on the roulette layout was also analysed to examine participants' wagering strategies (see Table 1). There was no effect of Location upon the mean number of numbers covered ($F(2,44)=2.424$, $p>.05$, $\eta^2=.10$), nor was there an effect of Decisional Support ($F(1,22)=0.845$, $p>.05$, $\eta^2=.04$). Hence there were no changes in the degree to which participants covered the roulette layout.

Another measure of the degree of preferred risk is the mean payouts that are associated with the numbers covered (see Table 16.1). There was no effect of Location ($F(2,44)=1.239$, $p>.05$, $\eta^2=.05$) or Decisional Support ($F(1,22)=0.049$, $p>.05$, $\eta^2=.00$), but there was an interaction between Location and Decisional Support ($F(2,44)=3.726$, $p<.05$, $\eta^2=.15$). The interaction was disaggregated by examining the simple main effects. As may

be seen in Figure 16.1, the mean payouts sought were comparable when the previous numbers were not displayed (F(2,44)=0.729, p>.05), but with the additional decisional support there were shifts in the preferred risk associated with the pre-recorded and videolinked condition. Although there was little change in the collocated condition (F(1,44)=.003, p>.05), there was a decrease in payouts sought for the videolinked condition (F(1,44)=5.332, p<.05), and people sought higher payouts for the pre-recorded condition than the videolinked condition (F(1,44)=8.35, p<.001).
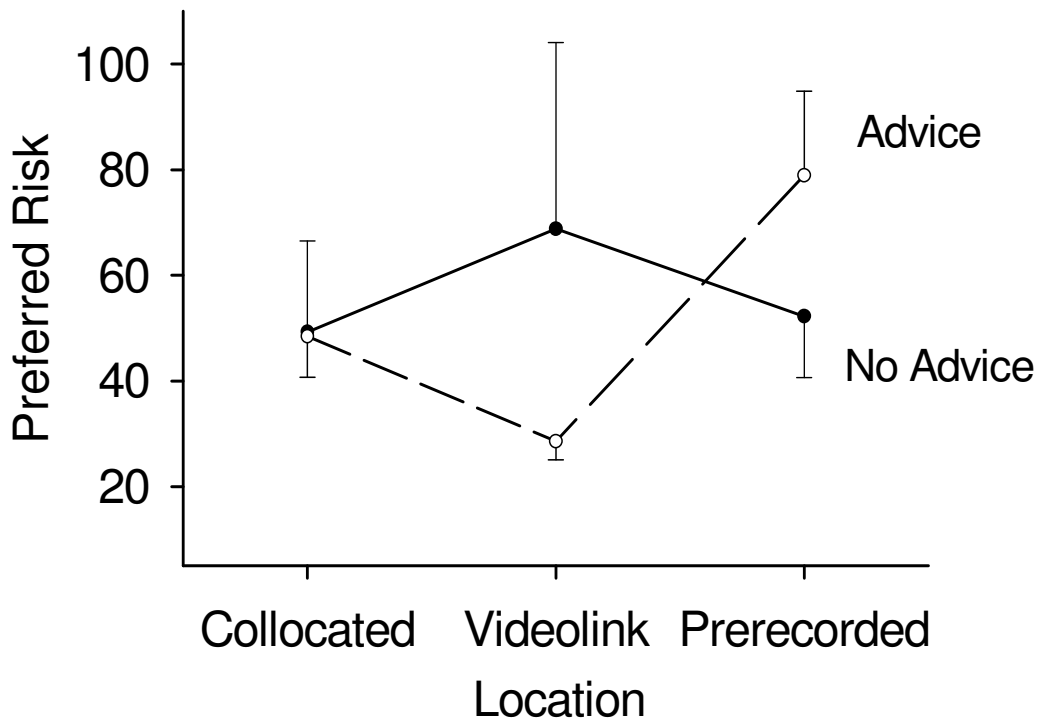
Figure 16.1. Preferred risk as a function of the location of the roulette wheel when a decision aid was provided (N=12) or not provided (N=12).

To offer insights into the reasons for the shift in preferred risk, the times spent in placing bets were analysed. The time spent placing the bet could be taken as an index of confidence. A faster wager placed implies greater confidence. There was no effect of Location upon the time spent thinking before placing a bet (F(2,44)=0.013, p>.05, η^2=.00), but Decisional Support tended to influence the amount of time spent thinking before placing a bet (F(1,22)=3.335, p=.081, η^2=.13). People took more time placing a bet without a list of previous numbers (M=2.565, SE=0.170) than when a list of previous numbers were available (M=2.125, SE=0.170). A significant interaction between Location and Decisional Support (F(2,44)=4.370, p<.05, η^2=.17) may be seen in Figure 16.2.   When no previous numbers were supplied, people were slower placing bets when they were distanced in space or time from the spinning of the roulette wheel. However, when the previous numbers were supplied, people were faster placing bets when previous numbers were supplied. People were

faster placing bets when advice was supplied and outcomes were prerecorded ($F(1,22)=9.967$, $p<.01$). This suggests that people tended to think about previous numbers when placing their bets, and decisional support speeded up this process, but is somewhat surprising as a list of previous numbers makes the least sense for people playing sections of the wheel when the outcomes are actually randomized recordings. Nevertheless, the faster reaction times may explain why people preferred higher risk for the pre-recorded condition under decisional support.
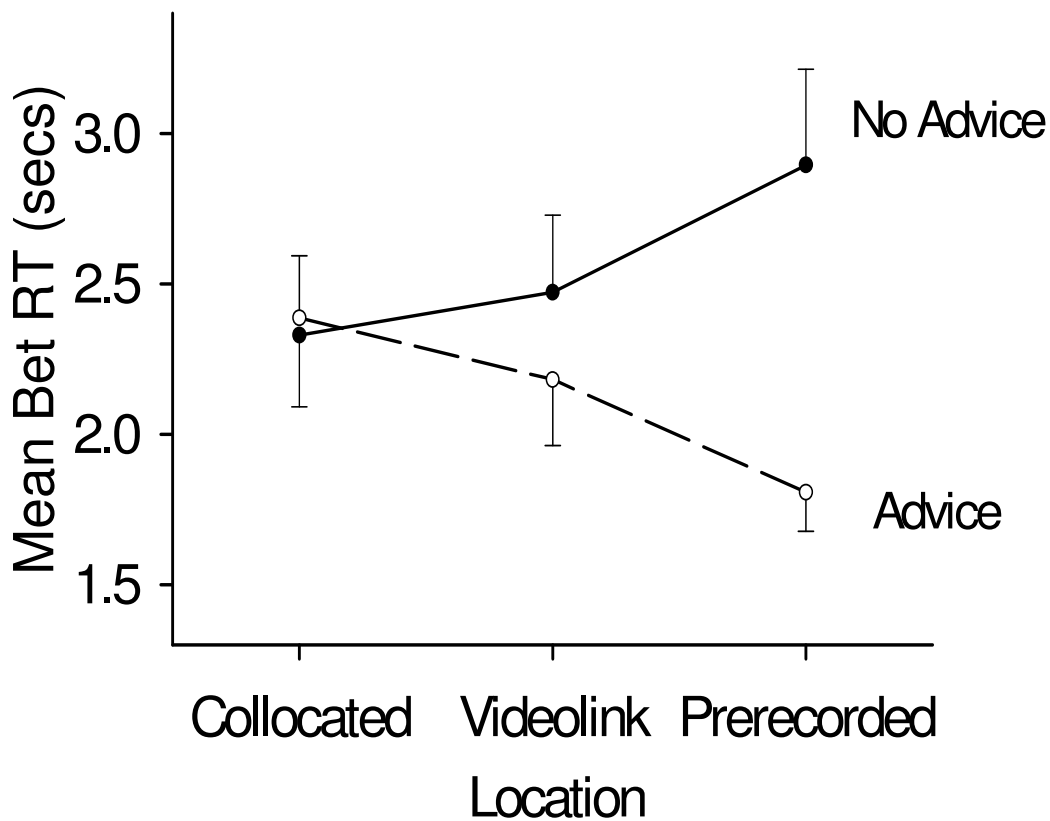

Figure 16.2. Participants' mean reaction time to place a bet when the roulette wheel is in different locations and a decision aid is provided (N=12) or not provided (N=12).

The time taken by participants to register the first and last number for their call bets was also analysed. While there was no effect of Decisional Support ($F(1,22)=0.578$, $p>.05$, $\eta^2=.03$), there was a significant effect of Location ($F(2,44)=3.391$, $p<.05$, $\eta^2=.13$). People took longer to register the first number of their call bet in the pre-recorded condition (M=4.883, SE=0.576) than the collocated condition (M=4.074, SE=0.404) ($F(1,22)=6.735$, $p<.05$). A significant interaction may be seen in Figure 16.3 ($F(2,44)=3.805$, $p<.05$, $\eta^2=.15$). In the videolinked condition participants spent more time registering the first number of call bets when a list of previous numbers were provided, than when they were not ($F(1,44)=10.723$, $p<.01$). When no advice was provided participants spent more time

registering the first number of call bets in the pre-recorded condition than the videolinked condition (F(1,44)=8.368, p<.01).

As participants commented that the outcomes were already known for the pre-recorded video conditions, it would appear they processed this fact and the decisional support as evidence when placing bets, and it appeared to encourage them to accept higher risk wagers. Although not significant $F(1,22)=1.197$, $p>.05$, $\eta^2=.05$), the time to register the second number in call bets was higher when decisional support was supplied. There was a tendency ($F(1,22)=3.180$, $p=.051$, $\eta^2=.13$) for the times required to register the second number to also be higher for videolinked (M=2.347, SE=0.190) and prerecorded conditions (M=2.151, SE=0.176) than the collocated condition (M=1.923, SE= 0.131).
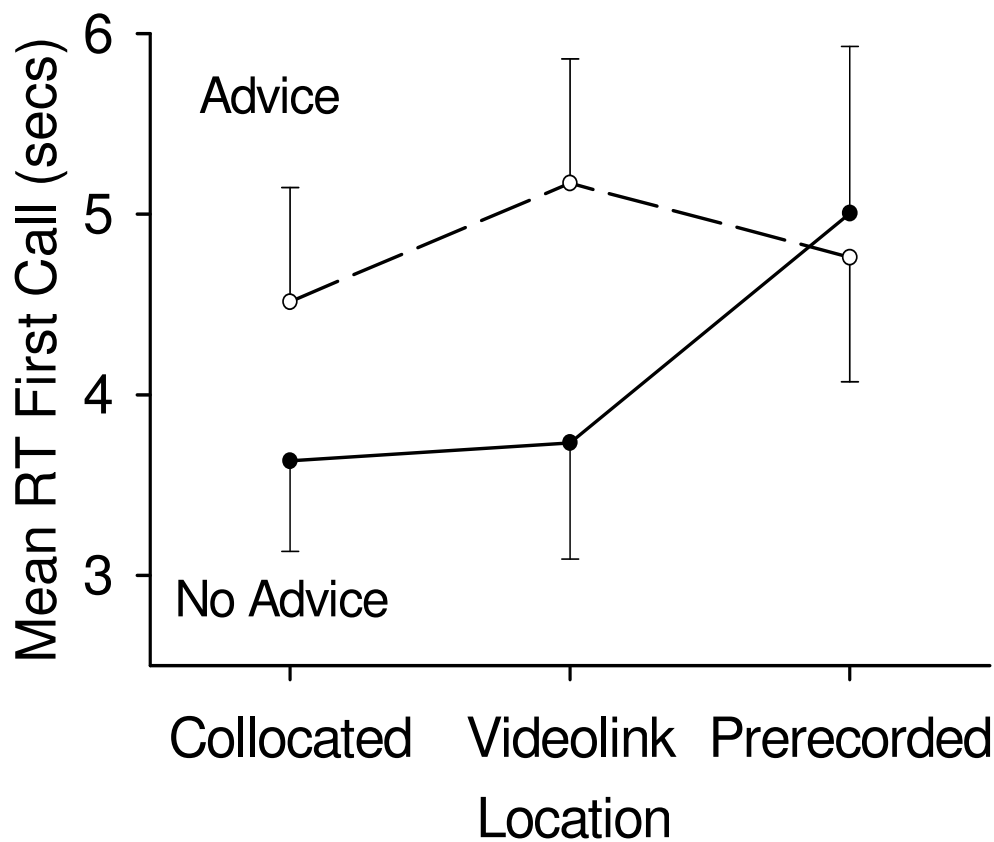
Figure 16.3. Mean reaction time for the first call bet when wheel location is varied and advice is provided (N=12) or not provided (N=12).

As a check on the probity of each condition, the average amounts actually won in each condition were analysed. As expected, there was no effect upon Location $(F(1,22)=0.337, p>.05, \eta^2=.02)$ or Decisional Support $(F(1,22)=2.772, p>.05, \eta^2=.11)$ upon the mean amounts won or lost. As successful gambling could be linked to control over wagering patterns, the final outcomes were also analysed for each condition. Although Decisional Support did not confer any overall benefit $(F(1,22)=0.307, p>.05, \eta^2=.01)$, there was a significant effect of Location upon the final totals won or lost for each condition $(F(2,44)=4.354, p<.05, \eta^2=.17)$. Participants were more likely to come out ahead in the collocated condition (M=10.25, SE=16.42), followed by the videolinked condition (M=-8.72, SE=12.07) and more likely to have lost in the pre-recorded condition (M=-44.09, SE=12.62). This may reflect the greater degree of risk people were willing to take for the pre-recorded condition.

After the experiment concluded, participants were asked which condition they preferred. There was a significant departure from equal preferences $(\chi^2 (2df)=31.750, p<.001)$. People preferred the collocated condition (n=21) over the videolinked (n=1) and pre-recorded (n=2) conditions. Participants were also asked which condition they preferred the least. There was again a significant departure from equal preferences $(\chi^2 (2df)=19.750, p<.001)$. People preferred the pre-recorded condition the least (n=18), followed by the videolinked (n=5) and collocated (n=1) conditions.

16.4 Discussion

The present study sought to determine how computer-mediated communications influenced the wagering process using a laboratory simulation of roulette. As was expected, computer mediation detracted from the gambling experience. People preferred to be in the presence of the roulette wheel, tended to be more confident of winning in the presence of the roulette wheel, and disliked the pre-recorded video condition. The effects of computer mediation upon wagering behaviour were less clear. Participants' initial confidence did not directly convert into higher wagers. However, this may reflect the complex nature of wagering associated with roulette, where multiple bets could be placed at a variety of odds. An analysis of the preferred level of risk suggested computer mediation influenced wagering behaviour. Participants took less time to decide the amounts to bet, and took more time placing these bets with decisional support, particularly in the pre-recorded video condition where they took greater risks.   As these effects interact with the availability of decisional support, it is likely that these effects are linked to the operation of erroneous cognitions and illusions of control.

When outcomes were delivered as pre-recorded video, and decisional support was provided in the form of a list of previous numbers, participants preferred higher levels of risk on average. This seems to arise because there are more cues to predict the next numbers to be spun. In the pre-recorded condition someone (i.e. experimenter) potentially knew which number would be spun next, and the selection of each outcome videofile could be seen on the screen. Whereas for those participants using a system (e.g., betting on sections of the wheel perceived to be currently "hot"), the provision of the previous numbers would assist the operation of that system.   For participants, each of these factors appeared to provide evidence supporting a perception that future numbers could be predicted, and encouraged higher levels of preferred risk. For instance, participants may have been hoping that the experimenter made a mistake and played the same videofile twice. Although this did not

occur, the potential would be sufficient to justify hazarding some higher bets on the previous number.

Participants reported feeling uneasy about the pre-recorded videos but were unable to explain why. They acknowledged that while the researcher potentially knew the winning numbers beforehand the researcher could not know beforehand how each participant would bet. Participants believed the pre-recorded videos were not "rigged" and that video "sets" were assigned at random. Participants agreed then, on an intellectual level, that the chances of winning/losing were the same as in the other two conditions yet on an emotive level were somehow less trusting of it. They also reported it to be the least interactive/engaging/involving of the three conditions. Such issues were illustrated dramatically during an Australian trial of a national televised bingo game (see http://kevmarl.wordpress.com/2007/10/22/sevens-national-bingo-night-isnt-actually-a-bingo-night-at-all/). To control the amounts won, the results were pre-recorded, and as the outcomes were predetermined, a limited number of winning tickets could then be printed. Unbelievably Australia's Channel 7 recorded the draw of each number, but then changed the image to a different winning number, a fact revealed when viewers recorded the draw and noticed the switch in numbers. This problem could have been avoided by recording separate complete video files for each winning number. It is not that hard technically to record 37 complete video segments for 37 winning numbers, but it does involve a degree of file handling. Presumably there was less perceived risk to the organisers if the winning numbers were tightly controlled by switching to a single recording for the final outcomes.

The videolinked condition was preferred over the pre-recorded condition. However, in the videolinked condition participants preferred lower levels of risk, particularly when decisional support was available. Although both videolinked and pre-recorded conditions provided full screen video images of the roulette wheel spinning, it would seem the increased physical distance reduced the perception that the social contract could be enforced.

Participants preferred to be in the physical presence of the roulette wheel, and the lower preferred risk in the presence of decisional support confirms observations from other sources that suggest *participants have concerns with the computer mediation of the gambling experience* (see http://wizardofodds.com/casinos/badcasinos.html). However, *online forms of gambling appear to be preferred for their convenience and reduced cost* (Wood, Williams, & Lawton, 2007). Thomas, Allen, and Phillips (2009) also note convenience as being a major factor in influencing the choice of offline gaming venue. Hence the higher perceived risk could be offset by the increased convenience and the reduced cost to the consumer. Thus, reports that greater numbers of problem gamblers play online may reflect their greater interest in gambling. The convenience of online forms of gambling would lead to the over representation of problem gamblers on this medium rather than the actual attractiveness of online gambling. Nevertheless, convenience and lower cost may influence uptake as gambling at offline gaming venues is driven primarily by convenience and, to a less extent, by social factors (Thomas, Allen, & Phillips, 2009).

The provision of decisional support was found to influence wagering behaviour. In simpler Blackjack tasks, decisional support has been observed to increase confidence (Chau, Phillips, & Von Baggo, 2000) and wagering (Phillips & Ogeil, 2007; 2010), but such effects may vary as a function of education (O'Hare, Phillips, & Moss, 2009). Although this might be considered support for an illusion of control (Langer, 1975), it appears that effects attributed to illusion of control are stronger when associated with the potential to predict

outcomes (Presson & Bennassi, 1996). As we observed decisional support reduced the time taken to decide to place bets, and increased the time taken to decide to locate bets, it seems that decisional support is not contributing to an illusion, but is instead influencing the processing occurring as decisions are made. Presumably the decisional support provides evidence for the belief that the odds can be overcome (Cohen, 1979; Coventry, 2002; Phillips & Amrhein, 1989). Indeed, within the context of a greater potential access to computer-mediated forms of gambling, it should be pointed out that computer mediation affords far greater potential for decisional support. The greater computational power and data storage capacity means that computer-mediated forms of gambling will have a greater access to game statistics, form guides and tipping sites that may support and encourage gambling activities.

A variety of complaints have been made against online gaming sites (see http://www.casinomeister.com/rogue/index.php), and these relate to the previous issues of usability, anonymity, and involvement. Complaints detailed on casino blacklist sites refer to poor customer service (usability), but also include problems associated with the identification of the corporations behind dubious sites (anonymity) (Kapcelovich, 2009). A corporation running a dubious online casino that has developed a poor reputation can simply change its name and website (Kapcelovich, 2009) whereas land-based casinos have a considerable investment in a geographical location and its community (Eadington, 1995; 2004). Other complaints refer to the lack of fidelity (influencing degree of involvement) in the reproduction of games such as Blackjack, where online games may be played from shoes with an infinite rather than a fixed number of decks.

16.4.1 Limitations

In the present study the participants were university students who reported they played roulette infrequently. As highly educated groups are less interested in gambling, it could be argued that the present sample was somewhat unrepresentative of the community. However there was no significant difference between the relative proportion of gamblers in our sample, and those from our community estimates (χ^2(3df)=2.867, p=.413) (see Chapter 2 of the survey data). Indeed, given the younger age of the present sample, the data are more likely to reflect responses of the technology users that may be considering gambling using communication technologies.

As a laboratory simulation of roulette was employed in which participants played for a high score, it is possible that the experimental task did not elicit the same levels of involvement and excitement that would be associated with real gambling (Anderson & Brown, 1984). To address this issue we took steps to encourage attempts at high scores. As the two top scoring participants won iPods valued at approximately AUS$200 and the pool of participants was comparably small we feel participants were motivated to attain high scores.

A laboratory simulation of roulette may also overlook some ancillary cues associated with gambling. Some research has observed that the presence of others may *facilitate* gambling behaviour (Rockloff & Dyer, 2007). For instance, Rockloff and Dyer (2007) found the presence of cues (sight and sound) indicating that other players were wining led to more wagering and greater losses in a simulated gambling experiment. Hence the present study may actually underestimate the reduced popularity of online gambling observed in the laboratory. Even if such cues are made available electronically using videolinks, the cues are less likely to be effective, as social facilitation effects are reduced with increasing distance (Knowles, 1983).

The present findings have been interpreted in terms of confidence and the processing of information. However, it is possible that changes in response time reflect alterations in the degree of impulsivity associated with the experimental conditions. As the speeds of response appeared to change with the amounts of information available in the form of a list of previous numbers, it seems more likely that the effects result from processing of information rather than impulsivity. Nevertheless we acknowledge that while imposing a degree of time pressure is consistent with roulette played in a casino, it may have also contributed to an impulsivity that may not otherwise be observed in some decision making tasks.

As a computerised version of roulette was used, it is also possible that the interface did not allow people to develop typical roulette wagering patterns. However, this is unlikely as we observed a variety of the typical strategies associated with roulette (Wagenaar, 1988). Participants were variously observed to spread bets across multiple numbers on the layout, to play sections of the wheel, and some adopted Martingale strategies. Given the increased availability of computerised forms, it is likely that the present study actually sampled a variety of the means whereby roulette is available. Nevertheless, the use of numeric call bets might have been more cumbersome than the mouse or touch screen versions that may otherwise be on offer.

16.4.2 Conclusion

The present study found that people preferred to be in the physical presence of a roulette wheel, and strongly preferred this to computer-mediated forms involving videolinks or pre-recorded outcomes. There were indications that preferences might be in part due to erroneous cognitions associated with computer mediation. Provision of decisional support in the form of a list of previous winning numbers seemed to encourage the development of erroneous cognitions, encouraging a preference for higher risk when pre-recorded outcomes were used and lesser risk when using videolinked outcomes. This would seem to arise from a greater perceived potential to predict future numbers associated with an outcome that occurred in the past and was recorded, and a reduced perceived potential to enforce social controls when wagering on an outcome that is occurring at a remote distance.   Data suggest that these effects may be mediated not so much by an *illusion* of control, but by a decisional mechanism that processes the *evidence* and concludes that the odds can be overcome. Although the present laboratory study suggests a reduced preference for computer-mediated forms of gambling, other factors such as convenience may influence consumer uptake and use.

16.5 Decisional Support and Online Influence – Experiment 2

The internet and mobile phone have increased consumer access to a variety of services (Mahatanankoon, Wen, & Lim, 2005; Nielsen, 2000) including products such as gambling (Eadington, 2004; Griffiths, 2003; Griffiths & Parke, 2004); hence the internet has attracted the attention of regulators (Chirqui, Ribisl, Wallace, Williams, O'Connor, & Arculli, 2008; Scoolidge, 2006; Watson, Liddell, Moore, & Eshee, 2004) over issues such as advertising (Hrywna, Delnevo, & Lewis, 2007; Monaghan, Derevensky, & Sklar, 2008). To advise and inform policy makers and regulators, the present study considered the potential influence of onscreen messaging during simulated gambling.

Although the internet and mobile phone potentially increase access to consumers, they also place an organisation's competitors just another click away (Nielsen, 2000).   Hence some organisations use recommender technology to support consumer activities (Montaner, Lopez, & De La Rosa, 2003). Recommender technology supports consumer behaviour and builds customer loyalty by assisting consumers to navigate product information spaces by suggesting items of potential interest based upon a consumer's profile (Fasli, 2007).

Technology may be utilised to advertise, and potentially subvert advertising bans within a jurisdiction (Hrywna, Delnevo, & Lewis, 2007). Individually customised, location-aware messages about events, activities, products and special offers can be sent to consumers in order to influence decision-making behaviour in real-time (Mahatanankoon & Vila-Ruiz, 2007; Yang, Cheng, & Dia, 2008). Due to the real-time and individualised aspect of this messaging, recommender technology can be more pervasive and may also be more influential (Yang et al., 2008) than advertising.

Other forms of decisional support have been proposed to better inform consumers (Monaghan, 2009; Monaghan & Blaszczynski, 2007). Commercial regulators and government departments are generally concerned with issues such as consumer informed choice and consumer protection (Monaghan, 2008). An example of this is the use of decision-aids in gambling environments. Several authors (Blaszczynski et al., 2005; Monaghan, 2008; 2009) have reported the introduction of strategies to inform gamblers of the risks involved with excessive gambling. Such strategies include displaying digital messages such as 'Don't gamble more than you can afford' between hands of table games and the use of odds displays to inform individuals of their chances of winning (Monaghan, 2009). Use of such technology has been somewhat successful in limiting excessive gambling behaviour (Blaszczynski et al., 2005). However, little research has been conducted into the effectiveness of such aids in real-time dynamic environments, gambling or otherwise (Blaszczynski et al., 2005; Brody, Kowalczyk, & Coulter, 2003).

In a study of electronic recommender agents, Haubl and Murray (2003) found that the provision of biased information could influence customer preferences. By using a recommender agent which focused on a specific attribute of various alternatives, Haubl and Murray (2003) showed that the preferences of shoppers could be influenced toward consideration of that attribute as the primary attribute. A recommender agent is a device which assists decision making by providing information about the various alternatives or suggesting a specific alternative. For example, shopping websites such as Ebay and Amazon suggest items which the buyer may be interested in purchasing based on previous purchases. Therefore, the electronic recommender agent was able to influence customer purchases through manipulation of perceived attribute importance. Furthermore, these preferences were maintained even when the aid was not present. Haubl and Murray (2003) postulated that the primary reason for this was that the consumers deemed the recommender to be a neutral source of information and that it was only logical to assume that the recommendations provided were provided with good reason. Indeed, as other authors note (e.g., Gretzel & Fesenmaier, 2007), for an electronic aid to be persuasive, it must appear to be relevant and transparent. That is, the recommendation device should appear to benefit the decision-maker and there should be obvious logic behind the recommendation (Gretzel & Fesenmaier, 2007).

As an experimental paradigm for addressing online behaviour, the present study used the game of Blackjack. Blackjack is a card game played against a dealer. The object of the game is to attain a total as close to 21 as possible, without exceeding 21 (busting), that also

exceeds the total attained by the dealer. In casinos the dealer has to draw cards until a total of 17 or greater is reached. For the player the game involves several decisions; namely the wager, and then the decision whether or not to draw cards. In this game, less than optimal behaviour can influence a player's chances of winning.

Blackjack is available in online forms, and while there is a recommended strategy to minimise loss called Basic (Thorp, 1966), people are known to engage in less than optimal behaviours in gaming venues (Wagenaar, 1988) and online settings (Chau, Phillips, & Von Baggo, 2000). Player behaviour may vary as a function of involvement, degree of risk and opportunity for deliberation (Phillips & Amrhein, 1989).

There are a variety of reasons for less than optimal play in Blackjack. Players may be ignorant of Basic (Chau, Phillips, & Von Baggo, 2000), and hence may benefit from decisional support. In addition, there are elements of an approach/avoidance conflict in Blackjack as the player is required to obtain a total less than 21, while beating the dealer's total. Within gaming venues and when playing for money, players are reluctant to draw further cards (fail to hit error) (Wagenaar, 1988). When playing for points online, players tend to draw cards when the odds are actually in their favour (fail to stand) (Chau, Phillips, & Von Baggo, 2000). Given that there are variations in willingness to approach or avoid in terms of willingness to choose cards in the game of Blackjack, it is of interest to determine whether online advice can influence player behaviour.

An important consideration for both commercial organisations and regulators is whether online advice can influence approach or avoidance behaviour. It is of specific interest to determine whether messages encouraging or warning consumers online and in real time can influence their choices. In addition, it is important to understand the circumstances (i.e. time pressure; risk) under which online advice can influence consumer use of electronic services (Horst, Kuttschreuter, & Gutteling, 2007). The present study will use Blackjack as a model of consumer behaviour, varying the speed and the levels of risk associated with the game. To simulate online inducements, in some conditions advice will only be given when Basic recommends that people draw extra cards (i.e., hit). To simulate online advisory warnings, in some conditions advice will only be given when Basic recommends that people do not draw further cards (i.e., stand).   It is expected that advice with a directional component will sway play in the recommended directions, namely a greater willingness to approach a card total of 21 when only advised to hit, or a reluctance to approach a card total of 21 when only advised to stand. The influence of online messaging as a function of time pressure and degree of risk will be inferred from the card totals that players draw and stand upon, and the proportions of fail to hit and fail to stand errors. Average wagers will be used as an index of consumer confidence.

16.6 Method

16.6.1 Participants

Participants were 24 university students ($M = 22.21$ years, $SD = 4.81$ years). Participants varied in gambling experience although all participants had gambled previously in a casino setting. Individuals with no gambling history or a history of gambling related problems were excluded from participation for ethical reasons. Participants received no remuneration for their participation.

16.6.2 Apparatus and Task

The game of blackjack was played on a Pentium 4 IBM compatible Personal Computer on custom written software that dealt cards and timed responses using assembly code. The computerised version of Blackjack resembled the game played in casinos except there was no provision for doubling or splitting. A short tone signalled the beginning of each hand. The message "Place your bet now" then appeared on the screen and participants entered their wager (1-9) using the number pad. To manipulate the degree of risk, the number of points associated with a unit wager was varied between conditions. In low risk condition the value of the wager was multiplied by 2, in the high risk condition the value of the wager was multiplied by 10.

After wagering some points, the player and dealer received their card(s) in the bottom-left and top-left of the screen respectively and the hand totals appeared above the respective cards. Participants were then required to decide whether to refuse further cards (stand) by pressing the space bar, or choose another card (hit), by pressing any other key. The experimental conditions manipulated time pressure; in the fast condition decisions were required within 1 second, whereas in the slow condition decisions were required within three seconds. Where a response was not forthcoming, the defaults applied. Defaults were a minimum bet and drawing another card.

When appropriate, advice appeared in the centre of the screen ("Advised to hit" or "Advised to stand"), and was refreshed after each card was dealt. To evaluate the potential influence of decision aids, in some conditions participants only received hit advice within a given block of trials; in other conditions participants only received stand advice. For each condition, the advice was always correct according to Basic strategy (Thorp, 1966) and was based upon the player and dealer card totals (see Table 15.2). For example, in the Hit advice condition, participants received just hit advice but only when it was appropriate. When the correct decision according to Basic was to stand, no advice was provided in the Hit advice condition.

Table 16.2. Basic Blackjack Strategy (Thorp, 1966).

		Dealer's Up-card									
		2	3	4	5	6	7	8	9	10	A
	12	**H**	**H**	*S*	*S*	*S*	**H**	**H**	**H**	**H**	**H**
	13	*S*	*S*	*S*	*S*	*S*	**H**	**H**	**H**	**H**	**H**
Player's Total	14	*S*	*S*	*S*	*S*	*S*	**H**	**H**	**H**	**H**	**H**
	15	*S*	*S*	*S*	*S*	*S*	**H**	**H**	**H**	**H**	**H**
	16	*S*	*S*	*S*	*S*	*S*	**H**	**H**	**H**	**H**	**H**
	17	*S*	*S*	*S*	*S*	*S*	*S*	*S*	*S*	*S*	*S*

* H denotes 'hitting' or drawing a card and S denotes 'standing' or declining any extra cards
** The rest of the table is not included as the player is advised to hit on any total below 12 and stand on a total of 17 or higher

Once players had chosen to stand or had busted, the computer automatically dealt cards for the dealer. As per casino procedures the dealer was dealt cards until a card total above 16 was obtained. At the completion of the hand, participants were informed of the

result of the hand via an on-screen message. The amount won or lost on that hand and amount won or lost so far in that block of trials appeared along the bottom of the screen.

16.6.3 Procedure
The experimenter explained the rules of the simulated version of Blackjack and described the eight experimental conditions to the participants. The experimenter then informed participants that they should attempt to win as many points as possible. Participants were also informed that Basic advice would appear on the monitor in some instances and were told that this advice was "good advice". However, participants were not given any instructions regarding adherence to the advice. Participants then completed 24 practice trials to familiarise themselves with the apparatus and task. The practice trials included six trials using a seven second time limit which enabled the experimenter to re-explain several aspects of the task simultaneously to the participant engaging in the task. Participants then completed the eight conditions each containing 30 hands for a total of 240 hands of Blackjack.

At the beginning of each condition participants were alerted to the specific time and risk parameters for that experimental condition via on-screen messages ("You will have *X* seconds to decide" and "Bets will be multiplied by *X*"). Risk level was also signified by screen background colour (green for low-risk, blue for high-risk). No notification of advice condition was given as the advice, where appropriate, appeared in the centre of the screen ("Advised to hit" or "Advised to stand"). At the completion of the hand, participants were informed of the result of the hand via an on-screen message. The amount won or lost on that hand and amount won or lost so far in that block of trials appeared along the bottom of the screen.

The computer recorded the amount wagered, the totals hit and stood on, and deviations from Basic strategy for each hand. Experimental conditions were separated by nine seconds to provide a short rest interval. The order of presentation of conditions was based on a Latin Square to control for order effects and fatigue. After participants had completed the experiment they were debriefed regarding the dangers of gambling and the negative expected outcome associated with all forms of gambling in the long term.

16.6.4 Design
The experiment was a 2x2x2 time (one or three seconds) by risk (wagers multiplied by two or ten), by advice (hit or stand only) repeated design. To test decision-aid influence, participants received only either hit or stand advice within a given block of trials. To measure adherence to the decision aid, deviations from Basic advice (i.e., failures to hit, failures to stand) and the mean total at which participants drew their last card were analysed. Mean bet sizes were used as an index of consumer confidence.

16.7 Results
Participant's behaviour was recorded and means were subsequently calculated and analysed using SPSS v15. Preliminary analysis revealed a significant Kolmogorov-Smirnov test of normality statistic for failure to hit errors. Participant 8 was identified as a univariate outlier ($z > 3.29$) which had caused the distribution to become non-normal. As there was no logical or theoretical reason to believe that this outlier was not a part of the intended

population, this outlier was retained but its influence reduced by score truncation as discussed by Tabachnick and Fidell (2007). Further analysis subsequently indicated that the distribution of failure to hit errors had been normalised. No further assumption violations were detected and so all data was retained. Hypotheses were tested using four three-way repeated measures analysis of variance (time × risk × advice). As all data was retained, n in each cell was 24.

To address the effects of the directional advice supplied by the decision aid, the mean number of failures to hit was analysed. Only the effect of time was significant. Participants committed fewer failures to hit when given three seconds to make decisions ($M = 1.74$, $SD = .31$) than when given only one second to make decisions ($M = 2.31$, $SD = .28$), $F (1,23) = 4.81$, $p = < .05$, $\eta^2 = .173$. There were no effects of risk or advice and no significant interactions.

As failures to hit are less common in simulated Blackjack, the mean number of failures to stand was also analysed. The effect of time was significant. Participants committed more failures to stand under a one second time limit ($M = 5.93$, $SD = .51$) than under a three second time limit ($M = 4.33$, $SD = .48$), $F (1,23) = 18.52$, $p < .05$, $\eta^2 = .446$. The effect of advice was also significant. Participants committed a greater number of failures to stand when the decision-aid provided only hit advice ($M = 5.64$, $SD = .46$) than when the decision-aid provided only stand advice ($M = 4.63$, $SD = .45$), $F (1,23) = 23.55$, $p < .05$, $\eta^2 = .506$. There was no effect of risk and no significant interactions.

To further explore the effects of directional advice, the average total that participants drew their last card on was also analysed. An effect of time was discovered. When given one second to decide, participants drew their final card on a higher total ($M = 11.83$, $SD = .77$) than when given three seconds to decide ($M = 11.37$, $SD = .80$), $F (1,23) = 15.63$, $p < .05$, $\eta^2 = .405$. An effect of advice was also discovered. Participants drew their last card at a lower total when only stand advice was given ($M = 11.41$, $SD = .81$) than when only hit advice was given ($M = 11.79$, $SD = .73$), $F (1,23) = 24.69$, $p < .05$, $\eta^2 = .518$. There was no risk effect and no significant interactions.

As a potential index of consumer confidence, average bet size was analysed to determine whether participants' wagering decisions were influenced by the independent variables. The results showed that participants wagered more points per hand under the three second conditions ($M = 5.78$, $SD = 1.66$) than under the one second conditions ($M = 4.77$, $SD = 1.47$), $F (1,23) = 15.06$, $p < .05$, $\eta^2 = .396$. Participants also selected higher numbers for wagers under low-risk conditions ($M = 5.79$, $SD = 1.43$) than under high-risk conditions ($M = 4.76$, $SD = 1.68$), $F (1,23) = 17.21$, $p < .05$, $\eta^2 = .428$. There was also a significant advice by risk interaction $F(1,23)=4.347$, $p < .05$, $\eta^2 = .159$, that may be seen in Figure 16.4. The interaction was decomposed using separate 2x2 ANOVAS at each level of risk. While the effect of advice was not significant at low risk $F(1,23)=1.144$, $p > .05$, $\eta^2 = .047$, the effect of advice was significant at high risk, $F(1,23)=6.223$, $p < .05$, $\eta^2 = .213$. This indicates that online inducements or warnings may influence consumer confidence, but that the effect may be a function of the perceived risk of the activity.

Figure 16.4. Mean points vary as a function of risk and direction of advice supplied.
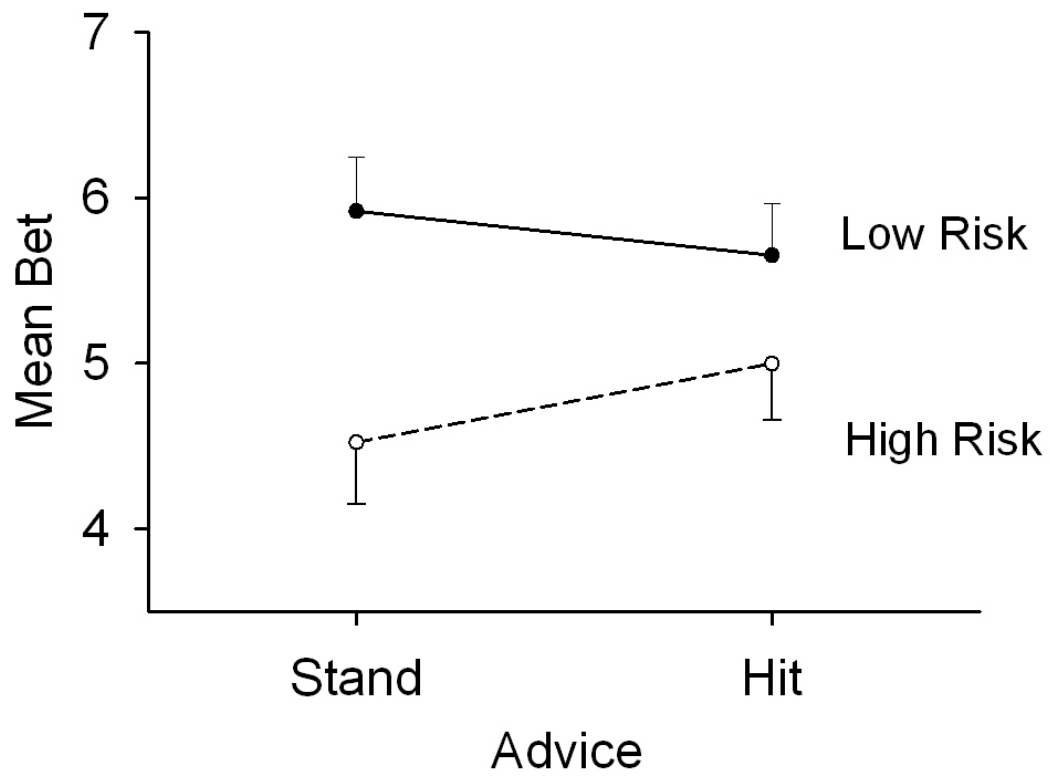
16.8 Discussion

The present study aimed to determine whether online advice with a directional component could sway a person's decisions in a specific direction. To accomplish these aims the study required participants to play a computerised version of the casino game Blackjack in which the decision aid only supplied advice of a specific form (hit or stand) while also manipulating factors such as time pressure and risk that might influence use of the decision aid.   As has been observed previously (Phillips & Amrhein, 1989), time pressure and risk influenced player behaviour, but more importantly, advice that was designed to minimise loss (Basic) but directed just towards hitting or standing, swayed players towards greater or lesser card totals, and reduced specific forms of errors.   At higher risk, the decision aid also influenced wager size. At higher risk, recommendations to *hit* and to approach higher card totals were accompanied by *higher* wagers, while recommendations to *stand* and avoid higher card totals were accompanied by *lower* wagers. This indicates that online advice can have a potential role influencing consumer behaviour.

Online advice was shown to be capable of influencing player behaviour in specific directions. Although the number of failures to hit did not differ significantly between advice conditions, this was because the number of failures to hit was quite low with an average of approximately 16 out of 240 (6.67%) for every participant. Therefore, there may have been too few errors of this type overall to convey any significant difference. Hence, this suggests that participants generally hit when they should have hit. Nonetheless, the number of failures to stand did differ significantly between advice conditions with a greater number of errors noted in the hit conditions than in the stand conditions. It would appear then that participants were hitting when they should have been standing. This is in keeping with observations that the proportions of these errors vary with risk, with failures to hit being more common in casinos (Wagenaar, 1988), and failures to stand being more common in the laboratory (Chau, Phillips, & Von Baggo, 2000).

In the current study the average percentage of Basic errors was 24.2%. If the preponderance of fail to stand errors were ignored, this error rate would be comparable with the error rate of 24.3% reported in Australian casinos by Walker, Sturveska, and Turpie (1995). The consequence of departures from Basic strategy is to concede a greater advantage to the casino (Hannum, & Cabot, 2005). Although Basic is a strategy that minimises loss, players are known not to comply with Basic (Wagenaar, 1988; Walker, Sturveska, & Turpie, 1995), this may arise from a fear of obtaining a total greater than 21 and busting (Wagenaar, 1988) or from ignorance (Walker, Sturveska, & Turpie, 1995). As Basic is not automatically followed even when immediately available (Chau, Phillips, & Von Baggo, 2000), it is likely that players do not judge the strategy as sufficiently reliable. For instance Horst, Kuttschreuter and Gutteling (2009) found online services provided by the government were not utilised by individuals if the service is not perceived as trustworthy. Indeed other studies using Blackjack have suggested that personalised strategies are preferred in the face of losses (Phillips & Amrhein, 1989). Nevertheless, the provision of directional online advice had the potential to reduce the fail to stand errors that are more common in simulated Blackjack in the laboratory.

Wager size was analysed as an index of player confidence. At higher risk the advice to draw more cards and approach a card total of 21 encouraged greater wagering behaviour, while at lower risk the advice to stand and not draw more cards reduced wagering behaviour.

Hence the directional decision aid influenced player behaviour, encouraging not just a greater willingness to risk higher card totals approaching 21 but also greater wagering in the hit condition. In the stand condition the directional decision aid discouraged the risking of higher card totals, and also reduced wagering in the stand condition. Presumably the decision aid focuses attention upon attributes such as the need to approach 21 and take risks (or a need to avoid 21, be cautious and avoid busting) (Haubl & Murray, 2003) and this concern to approach or avoid higher totals extends towards other behaviours such as wagering.

In the present case the decision aid was supplying limited but faithful information as to behaviours that would minimise loss, but that does not mean consumers will necessarily follow such aids. For instance, O'Hare, Phillips and Moss (2009) used a Blackjack game with full Basic advice and found compliance with Basic advice was significantly correlated (r=-0.3) with levels of logical reasoning ability, and varied with educational level. In the present study there were indications that confidence associated with the decision aid advice might vary as a function of risk. Although not significant, at low risk there was a tendency for advice to hit and approach higher totals to reduce wagering (mean bet = 5.652, SE=0.311), and advice to stand and avoid higher totals to increase wagering (mean bet = 5.919, SE=0.324). Power analysis indicates an effect with a Cohen's F of 0.223 that would require about 100 participants for this effect to have an 80% chance of being significant. In other words there is the potential for consumers to ignore and be emboldened by warnings when the situation is regarded as "low risk".

Trust or transparency of advice is important. For example, Gretzel and Fesenmaier (2007) and Haubl and Murray (2003) suggest that perception of the source of the information is a factor which dictates how influential a decision-aid may be. Also, for a decision-aid to be perceived as the primary information source, the individual needs to understand the relevance or logic behind the decision (Gretzel & Fesenmaier, 2007; McSherry, 2005). Therefore, for a decision-aid to be informative or influential even under situational constraints, developers of decision-aids need to ensure that decision-aids are perceived as trustworthy and the reasoning behind the advice given is clearly understood by the individual before the aid is presented (Jungermann & Fischer, 2005; Pu & Chen, 2007).

Overall, the findings provided support for the assertion that decision-aids are capable of influencing decision-making. There was not a complete compliance with Basic, suggesting that individuals may have been utilising personalised blackjack strategies. However, the finding that the average totals that participant drew cards on were influenced by advice direction suggests that some amount of influence can be exerted through the use of decision-aids. This finding has important implications regarding decision-aid development. Although some view decision aids as a tool to influence consumer purchasing behaviour (Gretzel & Fesenbaier, 2007), the technology also has the potential to inform consumer choices by providing information as to the true chances of winning or the risks associated with gambling (Blaszczynski et al., 2005; Monaghan, 2009) . For example, the use of decision-aids warning of the dangers of excessive gambling has been shown to reduce the instances of continued gambling (e.g., cases where individuals obtain extra funds to continue gambling) by up to 35% (Benhsain, Taillefer, & Ladouceur, 2004). Decision-aids may be used to inform individuals of the benefits and risks involved in making online purchases (Senecal & Nantel, 2004). Individuals in any setting which involves making decisions could benefit from information provided by decision-aids.

The findings of the present study also highlight the need to ensure that such technology is not used to take advantage of decision-makers. As previously stated, recent technological advancements, specifically regarding mobile commerce and mobile internet browsing, allow for the provision of location-aware, personalised messages to be sent to individuals with the aim of influencing event attendance, product purchases and even general behaviour without fully informing individuals of the harm and risk involved (Mahatanankoon & Vila-Ruiz, 2007; Mahatanankoon et al., 2005; Yang et al., 2008; Yuan & Tsao, 2003). One example of this is subscriptions to mobile applications or services, where the phone call can also be a mechanism for funds transfer. For instance missed call scams encourage phone calls, but do not inform the consumer as to the higher cost of the phone call. This can be a particular concern where such technology is used to target young people and children. Nevertheless, the present study indicates that decision aids can also be used to not just to encourage but also to warn consumers.

It was noted that the decision-aid was less influential under increased time pressure. This is in keeping with observations that simplified decision-making strategies (e.g., elimination by aspects) that focus on the most important attributes or piece of information available (Rieskamp & Hoffrage, 2008) are often used under time pressure. Even so, an alternative possibility has been suggested by some researchers that additional time may not be of benefit (e.g., Dijksterhuis, 2004). Indeed, there may be circumstances associated with greater cognitive demand where a decision aid might be more influential. For instance, Sarter and Schroeder (2001) and Todd and Benbasat (2000) found that in situations of greater cognitive demand associated with time pressure, that a decision-aid could be more influential if perceived to be reliable. This was presumably because the decision aid was seen as providing important information.

In conclusion, Experiment Two investigated the effects a decision-aid designed to influence individuals toward a specific alternative had on decision-making in real-time. The primary finding of the research suggests that decision-aids are capable of persuading individuals toward a specific alternative. Therefore, this study has revealed the capabilities of such technology as a tool which may be used to either inform or influence individuals. Decision-aid technology may be utilised for just to induce, but also to inform individuals of the risks of gambling (Monaghan, 2008).

However, the potential for misuse of such technology is high. Decision-aid technology may be used to persuade individuals to engage in activities or buy products in real-time without fully informing the individual of the consequences. Therefore, it is important that the use of such technology be monitored and limited to certain applications. Time pressure restricted utilisation of the decision-aid and reduced decision quality. Given that decision-aids are designed to reduce cognitive effort it may be desirable for individuals to adhere to decision-aid advice under such situational constraints. Therefore, future research may investigate how decision-aids can be perceived as beneficial to the individual under such conditions.

16.9 Conclusions - Experimentation

Regulators have previously sought to restrict advertising and access to electronic gaming machines in their attempts to control gambling. However, current technological developments allow a variety of web capable devices with sufficient computing power to support gambling (Griffiths, 2003; 2007; Parke & Griffiths, 2004). As a variety of emerging devices are developing these converging capabilities, this means it is technically possible with suitable connectivity for people to gamble on their personal computers, laptops, mobile phones, and televisions.

Computer mediation of wagering poses potential risks to consumer. The experimental studies demonstrate how consumers can be separated in time or space from gambling outcomes. Wagering at a distance (or across international boundaries) causes problems in a dispute arises. Nevertheless, there may also be risks associated with wagers placed on events that may be recorded, or delayed. There are measurable time delays associated with some gambling outcomes (e.g. seven seconds on *Foxtel*), and it is possible that one party may know of the outcome before the other whilst gambling. Our experiments demonstrate that potential consumers are sensitive to these issues. Potential consumers preferred simulated gambling when they were collocated with the outcomes, to situations where they were separated in time or space from the outcomes. Nevertheless, other factors such as cost and convenience may influence consumer choice. The higher proportions of problem gamblers engaged in online forms of gambling probably reflect interest, in the same way that higher proportions of problem gamblers can be found in gaming venues. These are the locations where "action" can be found, and it is their specific interest that attracts gamblers to these online sites.

Computational power affords greater opportunity for decisional support in the form of game statistics and form guides. Experiment One demonstrated that decisional support can influence wagering behaviour, encouraging greater (or lesser) risk as a function of computer mediation. Indeed Experiment Two demonstrates decisional support can also sway potential consumers towards greater or lesser risk behaviours, but it is possible that response may vary as a function of perceived risk.

16.10 References

Anatomy of a Con: The Wire. (n.d.) Retrieved December 4, 2008, from http://www.blongerbros.com/gang/wire.asp

Anderson, G., & Brown, R.I.F. (1984). Real and laboratory gambling, sensation-seeking and arousal. *British Journal of Psychology, 7*5, 401-410.

Baber, C. (1997). *Beyond the desktop: Designing and using interaction devices.* San Diego: Academic Press.

Benhsain, K., Taillefer, A., & Ladouceur, R. (2004). Awareness of independence of events and erroneous perceptions while gambling. *Addictive Behaviors*, *29*, 399-404.

Blaszczynski, A., Ladouceur, R., Nower, L., & Shaffer, H. J. (2005). *Informed choice and gambling: Principles for consumer protection.* Melbourne, Australia: Australian Gaming Council.

Brody, R. G., Kowalczyk, T. K., & Coulter, J. M. (2003). The effect of a computerized decision aid on the development of knowledge. *Journal of Business and Psychology*, *18*, 157-174.

Brooker, I.S., Clara, I.P., & Cox, B.J. (2009). The Canadian problem Gambling Index: Factor structure and associations with psychopathology in a nationally representative sample. *Canadian Journal of Behavioural Science, 41,*109-114.

Chau, A. W. L., Phillips, J. G., & von Baggo, K. L. (2000). Departures from sensible play in computer blackjack. *The Journal of General Psychology*, *127*, 426-438.

Chirqui, J.F., Ribisl, K.M., Wallace, R.M., Williams, R.S., O'Connor, J.C., & Arculli, R. (2008). A comprehensive review of state laws governing Internet and other delivery sales of cigarettes in the United States. *Nicotine & Tobacco Research, 10*(2), 253-265.

Cohen, L.J. (1979). On the psychology of prediction: Whose is the fallacy? *Cognition, 7,* 385-407.

Coventry, K.R. (2002). Rationality and decision making: The case of gambling and the development of gambling addiction. In J.J. Marotta, J.A. Cornelius, & W.R. Eadington (Eds.), *The downside: Problem and pathological gambling* (pp. 43-68). Reno: Institute for the Study of Gambling & Commercial Gaming.

Csikszentmihalyi, M. & Csikszentmihalyi, I.S. (1988). Optimal experience: Psychological studies of flow in consciousness. Cambridge, UK: Cambridge University Press.

Dijksterhuis, A. (2004). Think different: The merits of unconscious thought in preference development and decision making. *Journal of Personality and Social Psychology, 87*(5), 586-598.

Eadington, W.R. (1995). Economic development and the introduction of casinos: Myths and realities. *Economic Development Review*, Fall, 51-54.

Eadington, W.R. (2004). The future of online gambling in the United States and elsewhere. *Journal of Public Policy & Marketing, 23*(2), 214-219.

Fasli, M. (2007). On agent technology for e-commerce: trust, security and legal issues. *The Knowledge Engineering Review, 22* (1), 3-35.

Ferris, J., & Wynne, H. (2001). *The Canadian Problem Gambling Index: Final report*. Ottawa: Canadian Centre on Substance Abuse.

Goggin, J. (2008). Gaming/gambling: Addiction and the videogame experience. In M. Swalwell, & J. Wilson (Eds.), The *pleasures of computer gaming: Essays on cultural history, theory and aesthetics* (pp. 33-51). Jefferson, North Carolina: McFarland & Co.

Gretzel, U., & Fesenmaier, D. R. (2007). Persuasion in recommender systems. *International Journal of Electronic Commerce*, *11*, 81-100.

Griffiths, M.D. (2003). Internet gambling: Issues, concerns and recommendations. *CyberPsychology & Behavior, 6,* 557-568.

Griffiths, M. (2007). Interactive television quizzes as gambling: A cause for concern? *Journal of Gambling Issues, 20*, 269-76.

Hannum, R.C., & Cabot, A.N. (2005). *Practical Casino Math*. Las Vegas, Nevada: Trace Publications.

Haubl, G., & Murray, K. B. (2003). Preference construction and persistence in digital marketplaces: The role of electronic recommendation agents. *Journal of Consumer Psychology*, *13*, 75-91.

Henderson, M.A. (1985). *How con games work*. Secaucus NJ: Citadel Press.

Holtgraves, T. (2009). Evaluating the problem gambling severity index. *Journal of Gambling Studies, 25,* 105-120.

Horst, M., Kuttschreuter, M., & Gutteling, J. M. (2007). Perceived usefulness, personal experiences, risk perception and trust as determinants of adoption of e-government services in The Netherlands. *Computers in Human Behavior*, *23*, 1838-1852.

Hrywna, M., Delnevo, C.D., & Lewis, M.J. (2007). Adult recall of tobacco advertising on the Internet. *Nicotine & Tobacco Research, 9(*11), 1103-1107.

Jungermann, H., & Fischer, K. (2005). Using expertise and experience for giving and taking advice. In T. Betsch & S. Haberstroh (Eds.), *The routines of decision making* (pp. 157-174). New Jersey: Lawrence Erlbaum.

Kapcelovich, S. (2009). *The provision and role of responsible gambling features in influencing online gambling behaviour.* Paper presented at the 19th annual conference of the National Association for Gambling Studies, Canberra, 18-20 November, 2009.

Knowles, E.S. (1983). Social physics and the effects of others: Tests of the effects of audience size and distance on social judgements and behaviour. *Journal of Personality and Social Psychology, 45*(6), 1263-1279.

Kücklich, J. (2008). Forbidden pleasures: Cheating in computer games. In M. Swalwell, & J. Wilson (Eds.), The *pleasures of computer gaming: Essays on cultural history, theory and aesthetics* (pp. 52-71). Jefferson, North Carolina: McFarland & Co.

Langer, E.J., (1975). The illusion of control. *Journal of Personality and Social Psychology, 32(2),* 311-328.

Mahatanankoon, P., & Vila-Ruiz, J. (2007). Why won't consumers adopt m-commerce? An exploration study. *Journal of Internet Commerce*, *6*, 113-128.

Mahatanankoon, P., Wen, H. J., & Lim, B. (2005). Consumer-based m-commerce: Exploring consumer perception of mobile applications. *Computer Standards and Interfaces*, *27*, 347-357.

Matute, H., Vadillo, M.A., Vegas, S. & Blanco, F. (2007). Illusion of control in internet users and college students. *CyberPsychology & Behavior, 10*(2), 176-181.

McSherry, D. (2005). Explanation in recommender systems. *Artificial Intelligence Review*, *24*, 179-197.

Monaghan, S. (2008). Review of pop-up messages on electronic gaming machines as a proposed responsible gambling strategy. *International Journal of Mental Health and Addiction*, *6*, 214-222.

Monaghan, S. (2009). Responsible gambling strategies for internet gambling: The theoretical and empirical base of using pop-up messages to encourage self-awareness. *Computers in Human Behavior*, *25*, 202-207.

Monaghan, S & Blaszczynski, A. (2007). Recall of electronic gaming machine signs: A static versus a dynamic mode of presentation. Journal of Gambling Issues, 20, 253- 267

Monaghan, S., Derevensky, J., & Sklar, A. (2008). Impact of gambling advertisements and marketing on children and adolescents: Policy recommendations to minimise harm. *Journal of Gambling Issues, 22*, 252-274.

Montaner, M., Lopez, B., & De La Rosa, J. L. (2003). A taxonomy of recommender agents on the internet. *Artificial Intelligence Review, 19*, 45.

Nielsen, J. (2000). *Design web usability.* Indianapolis: New Riders Publishing.

O'Hare, M., Phillips, J.G., & Moss, S. (2009). The effect of contextual and personal factors on the use of recommenders in e-Markets. *The Ergonomics Open Journal, 2,* 207-216.

Parke, A., & Griffiths, M.D. (2004). Why internet gambling prohibition will ultimately fail. *Gambling Law Review, 8*(5), 295-299.

Phillips, J. G. & Amrhein, P. C. (1989). Factors influencing wagering in simulated Blackjack. *Journal of Gambling Behavior, 5(2),* 99-111.

Phillips, J.G., & Ogeil, R.P. (2007). Alcohol consumption and computer blackjack. *Journal of General Psychology, 134(3),* 333-353.

Phillips, J.G. & Ogeil, R.P. (2010). Alcohol influences the use of decisional support. *Psychopharmacology, 208*(4), 603-611.

Phillips, J.G., Saling, L., & Blaszczynski, A. (2008). The psychology of mobile phone use and misuse. In A.C. Harper & R.V. Buress (Eds.), *Mobile telephones: Networks, applications, and performance* (pp. 191-210). New York: Nova Science Publishers.

Presson, P.K., & Bennassi, V.A. (1996). Illusion of control: A meta-analytic review. *Journal of Social Behavior and Personality, 11*(3), 493-510.

Pu, P., & Chen, L. (2007). Trust-inspiring explanation interfaces for recommender systems. *Knowledge-Based Systems*, *20*, 542-556.

Rieskamp, J., & Hoffrage, U. (2008). Inferences under time pressure: How opportunity costs affect strategy selection. *Acta Psychologica*, *127*, 258-276.

Rockloff, M.J. & Dyer, V. (2007). An experiment on the social facilitation of gambling behaviour. *Journal of Gambling Studies, 23*, 1-12.

Sarter, N. B., & Schroeder, B. (2001). Supporting decision making and action selection under time pressure and uncertainty: The case of in flight icing. *Human Factors*, *43*, 573-583.

Scoolidge, P.J. (2006). Gambling blindfolded: The case for a regulated domain for gambling sites. *Gaming Law Review, 10*(3), 252-265.

Senecal, S., & Nantel, J. (2004). The influence of online product recommendations on consumers' online choices. *Journal of Retailing*, *80*, 159-169.

Suler, J. (2004). The online disinhibition effect. *CyberPsychology & Behavior, 7(3),* 321-326.

Svetieva, E., & Walker, M. (2008). Inconsistency between concept and measurement: The Canadian Problem Gambling Index (CPGI). *Journal of Gambling Issues, 22,*

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Boston, Massachusetts: Pearson Education.

The Amazing Johnathan (1997). *Every trick in the book.* Marina Del Rey, CA: Weird Stuff.

Thomas, A., Allen, F. & Phillips, J. (2009). Electronic gaming machine gambling: Measuring motivation. *Journal of Gambling Studies*, *25*, 343-355.

Thorp, E. (1966). *Beat the Dealer*. New York: Vintage.

Todd, P., & Benbasat, I. (2000). Inducing compensatory information processing through aids that facilitate effort reduction: An experimental assessment. *Journal of Behavioral Decision Making*, *13*, 91-106.

Toneguzzo, S. (1997). Internet gaming - Evidence for parliament of South Australia, Social Development Committee. In G. Coman & B. Evans (Eds.), *Responsible gambling: A future winner* (pp. 369-389). Proceedings of the 8th National Association for Gambling Studies conference, Melbourne, 27-29th November 1997.

Wagenaar, W.A. (1988). *Paradoxes of gambling behavior.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Walker, M. (1992). *Psychology of gambling*. Oxford: Pergamon.

Walker, M. B., Sturevska, S., & Turpie, D. (1995). The quality of blackjack play in Australian casinos. In J. O'Connor (Ed.), *High Stakes in the Nineties: Sixth National Conference of the National Association for Gambling Studies* (pg. 193-202). Fremantle, Australia: Curtin University.

Watson, S., Liddell, P.Jr., Moore, R.S., and Eshee, W.D. Jr. (2004). The legalisation of internet gambling: A consumer protection perspective. *Journal of Public Policy & Marketing, 23*(2), 209-213.

Whitty, M.T., & Carville, S.E. (2008). Would I lie to you? Self-serving lies and other-oriented lies told across different media. *Computers in Human Behavior, 24,* 1021-1031.

Whitworth, B. (2005). Polite computing. *Behaviour & Information Technology, 24*(5), 353-363.

Wilson, J. (2008). "Participation TV": Videogame archaeology and new media art. In M. Swalwell, & J. Wilson (eds.), The *pleasures of computer gaming: Essays on cultural history, theory and aesthetics* (pp. 94-117). Jefferson, North Carolina: McFarland & Co.

Wood, R.T., Williams, R.J., & Lawton, P.K. (2007). Why do internet gamblers prefer online versus land-based venues? Some preliminary findings and implications. *Journal of Gambling Issues, 20,* 235-252.

Yampolskiy, R.V. & Govindaraju, V. (2008). Embedded noninteractive continuous bot detection. *ACM Computers in Entertainment, 5* (4), Article 7.

Yang, W-S., Cheng, H-C., & Dia, J-B. (2008). A location-aware recommender system for mobile shopping environments. *Expert Systems and Applications*, *34*, 437-445.

Yuan, S-T., & Tsao, Y. W. (2003). A recommendation mechanism for contextualized mobile advertising. *Expert Systems and Applications*, *24*, 399-414.

17. Overall Conclusions

Hitherto gambling has been regulated in Australia by licensing operators and restricting access by controlling the numbers of Electronic Gambling Machines. However the internet and the converging capabilities of electronic devices can potentially increase access to gambling such that every individual regardless of age could readily access a gaming terminal by way of a personal computer, mobile phone, interactive television, set top box or games platform.   In this partly regulated environment, gambling is a higher risk activity as the technologies in web enabled devices can allow consumers to side-step existing controls and access gambling from unregulated environments where Australian jurisdiction does not apply and protection may be minimal if a dispute occurs.

This project considered the mechanisms underlying the provision of electronic gaming. Gambling online using information and communication technologies requires the transmission of a number of messages. The capacity to block or control these messages was considered. Regulation will probably be more successful if it targets the organisations hosting or sending messages, rather than blocking messages. As it may be difficult to block access to gambling online, it may be more feasible to restrict the movement of funds, or where regulated, control the providers and monitor the consumers and offer warnings and advice on appropriate devices (e.g. mobile phones; internet).

In the present project an experiment addressed the effect of computer mediation of gambling experience. Twenty four young adult participants engaged in simulated gambling for a prize (2 iPods). These participants preferred collocation during gambling, over wagering on events that were videolinked or pre-recorded.   This suggested that online forms of gambling would be less preferred forms of gambling, perhaps due to heightened perceived risk, and this poses an obstacle to participation. A heightened risk of online gambling is otherwise supported by survey data obtained from 1012 respondents Australia-wide that indicated that greater use of electronic services was associated with increased levels of Spam, and that problem gamblers were more likely to receive Spam.

A perceived heightened risk is likely to pose a barrier to participation in online gambling. For existing consumers of online gambling it is likely that there have been factors that have overcome the perceived risk (e.g. easier access, reduced cost).   From the survey data, the likely factors contributing to a willingness to participate in online gambling would appear to be a strong interest in gambling (as indicated by higher CPGI scores), or poor impulse control as indicated by problems restraining one's technology use. These additional factors would then overcome concerns about heightened risk. Nevertheless a problem controlling one's use of technology does not necessarily lead to an increase in online gambling. The survey data suggests that a specific technology may offer activities perceived to be more interesting and entertaining than gambling, and that interest in a specific technology may sometimes protect a person from gambling problems.

Studies on computer mediation of gambling experience indicated that the additional decisional support available with the computer (e.g. game statistics, form guides, replays) may assist and encourage wagering behaviour. In the present project a second experiment of 24 university students suggested that decisional support can work both ways, encouraging or discouraging risk taking. Hence it is equally likely that computers can be used to advise consumers of details of their expenditure and warn them of the risks of gambling.

Emerging technologies can circumvent existing controls, but are only tools allowing access to objects of interest. As tools, these technologies grant access and can support activities such as gambling, but gambling technologies are primarily of interest to gamblers, and to a lesser extent of interest to people who have problems restraining their use of technologies.   Indeed technology can also be used to protect consumers and minimise harm, but there are two ways in which this technology could be implemented. Providers of online gaming services may implement consumer protection technologies voluntarily by complying with a code of conduct (e.g. eCOGRA see http://www.ecogra.org/). There may be some benefits for gaming providers in voluntarily doing this as it might reduce perceived risks and lower barriers to participation for a wider section of the community. This is an option that will hopefully be taken up by providers internationally. Alternatively governments could legalise and regulate the provision of online gaming to ensure consumer protection measures are in place. Survey data from the present project indicates that for electronic services the community typically expects the provider or the industry to resolve any dispute, but 66% of the community did not know which were the appropriate self-regulatory bodies. In the event of a gambling problem however the community currently expects the problem to be addressed by counsellors, and this may be an issue during a crisis when the consumer is no longer located in the gaming venue, but is rather at some location that is remote from the provider of gaming products and services.

18. Glossary

2G. Second generation mobile phones, with speech capability. As distinct from 1G analog phones, 2G phones use digital technology.

3G. Third generation mobile phones, with speech and video capability. Phones with internet capability and higher data transmission capabilities.

ABS. Australian Bureau of Statistics.

ACAP. Advanced Common Application Platform. A standard for the development of interactive television. There are others (see BML or DVB-HTML).

ACCC.   Australian Competition and Consumer Commission.

ACMA. Australian Communications and Media Authority

ADC. analogue-to-digital converter .

ADMA. Australian Direct Marketing Association.

ADSL. Asymmetrical Digital Subscriber Line.

AEST.   Australian Eastern Standard Time.

AGM. Annual general meeting.

AMTA. Australian Mobile Telecommunications Association

ANOVA. Analysis of variance. A technique that considers whether any differences between several means is greater than a measure of sampling error.

APA. American Psychological Association.

APS. Australian Psychological Society.

Ashby's law of requisite variety. The law proposes that in order for a system to be controlled, the variety in the number of states or behaviours of the *control system* (or regulator) must be equal to or larger than the number of states or behaviours that are possible within the system as a whole.

ASTRA. Australian subscription television and radio association.

ASX. Australian stock exchange.

Attribute. Complex decisions involving choice may involve comparing options across a number of different dimensions or attributes.

AUSTAR. Provider of cable TV services in rural areas.

Availability hypothesis. The belief that increasing access leads to increasing problem.

AVI. A multi media format for combining audio and video information.

Banner. A form of online advertising. A wide and short, or tall and narrow link within a webpage to another webpage. Hosts of these advertising banners are paid per click. [Of course you are the millionth visitor to this website and have won a laptop!]   The equivalent on interactive television will be the red button.

Basic. A mathematically derived strategy for playing Blackjack that minimises losses.

Behaviorism. The belief that psychologists should only study measurable behaviours.

Biomodality. Having two common very frequent values instead of one very frequent value (unimodal).

Biometrics. Identification based upon unique biological characteristics such as finger prints.

Black-list filter. A method of controlling access to content on the internet. It allows access to all but a specific list of sites.

Blog. Short for web log. A diary that is available for everyone to see over the internet.

Bluetooth. A wireless protocol for transmitting information over short distance.

BML . Broadcast Markup Language. A language specifying how Web pages should be organized for display on a digital television. There are others (see DVB-HTML).

CAPTCHA. Completely Automated Public Turing test to tell Computers and Humans Apart. A test requiring that a human operator read and respond to a distorted image.

CB radio. Citizens' band radio. A system of short-distance radio communications between individuals.

CODEC. A system for encoding information for transmission. The term derives from 'compressor-decompressor', 'coder-decoder', or 'compression/decompression algorithm'.

Convergence. The tendency for computing devices to have converging capabilities, such as screens, wireless connectivity, positioning systems, and capability to conduct financial transactions.

Collaborative filtering. Software that analysing item ratings between similar groups of people.

Collocated. In the same place (from the Latin collocatus).

Content-based filtering. Software that analyses the link between the user and the description of the item the user is usually interested in.

COPA. Child Online Protection Act.

CPGI. Canadian Problem Gambling Index.

CPU. Central processing unit. The part of the computer that does the work.

CTV. Cable television.

CYMK. cyan, yellow, magenta and black.

DAC. digital-to analogue converter.

Denial of Service attacks. A large number of attempts to access a website can overload it, and deny access to other legitimate users.

Digital signature. A method of checking whether an image has been altered.

Digital watermark. A method of checking whether an image has been altered.

Dispute. Gaming essentially is the enactment of a contract, where both the proposer and the staker undertake to uphold their part of the contract. Where there is concern as to the fidelity of either party to the contract, or the outcome, dispute may occur. Dispute may be addressed by way of self-regulation, or by referring to an external regulatory body.

Domain names. Part of a web address that indicates a group of similar sites. For example .GOV or .AU indicate government or Australian websites.

DSM. The Diagnostic and Statistical Manual of the American Psychiatric Association, there has been a revised 3rd edition (DSMIII-R) and a 4th edition (DSM-IV).

DSS. Digital satellite system.

DTH. Direct to home.

DVB. Digital Video Broadcasting.

DVB-H. DVB-Handheld, the technical specification for bringing broadcast services to mobile handsets.

DVB-HTML. A language specifying how Web pages should be organized for display on a digital television. There are others (see BML).

eCash. Electronic funds transfers occurring over the internet using systems such as PayPal. Prepaid debit cards may also be used.

eCommerce. Businesss conducted over the internet, as distinct from being conducted over mobile phones (mCommerce) or television (iCommerce).

eCOGRA. eCommerce Online Gaming Regulation and Assurance (see trust mark).

eDemocracy. A form of direct democracy that uses information and communication technologies.

EFTPOS. Electronic Funds Transfer at Point of Sale

eGAP. Generally accepted practices and standards endorsed by eCOGRA.

EGM. Electronic Gaming Machine. A term used synonymously for poker machine, one armed bandit, and fruit machine.

eGovernment. The use of technology to enhance the access to and delivery of government services.

eTherapy. Potentially therapeutic interaction that occurs over the internet.

EXPO. A home shopping network on cable TV.

Diffusion of responsibility. A failure to action associated with large number of individuals that is based upon the belief that someone else will do it instead.

Discriminant validity. A measure does not correlate highly with something it is not supposed to correlated with.

Factor Analysis. A technique that summarises relationships between variables, by creating "factors". Factors are hypothetical constructs that explain correlations between correlations.

Flow. The tendency for an activity to absorb attention.

Foxtel. Provider of cable TV services in metropolitan areas.

FTP. File transfer protocol.

FTV. Free to air television.

GA. Gamblers Anonymous.

GIF. Graphics Interchange Format. A lossless form of image compression.

GP. General practitioner.

GPS. Global Positioning Service. System for locating devices such as mobile phones.

GSM. Global System for Mobile communications.

HFC. Hybrid Fibre Coaxial.

Horizontal integration - where transactions in one government agency leads to checks against data in other agencies.   See vertical integration.

Hype Cycle. After the initial development of a technology breakthrough (technology trigger), there is a period of enthusiasm for the potential of a technology associated with a frenzy of publicity (peak of inflated expectations), that is then followed by a period of disappointment (trough of disillusionment) where there is a realisation that the capability of the technology does not match the initial wild expectation such that the media abandons the topic. At the next stage (slope of enlightenment) some businesses may properly explore the practical applications of the technology, and then the technology becomes widely demonstrated and accepted by business (plateau of productivity).

HSB. hue, saturation and brightness.

IARBA. Independent Australian radio broadcasters association.

ICT. Information and Communication Technology.

ICSTIS. The regulatory body for all premium rate phone-paid services in the United Kingdom. It is now called PhonePay Plus.

ID. Identification see biometrics.

IIA. Internet industry association.

IMSI number. International Mobile Subscriber Identity number.

IANA. Internet Assigned Numbers Authority.

IP address. The Internet Protocol address is a numerical label that is assigned to devices participating in a computer network that uses the Internet Protocol for communication between its nodes.

IPTV. Internet Protocol television is a system for delivering digital television over the internet.

IPUS. Internet Problem Use Scale has a reliability of 0.860 and had a 0.485 correlation with self-reported amounts of internet use.

ITU. International Telecommunication Union.

iTV. Interactive television.   Systems allowing information flow both to and from the audience.

JPEG. is a commonly used method of lossy compression for photographic images (abbreviation is from the Joint Photographic Experts Group that created the standard).

Kbps. Kilobits per second.

KMO. Kaiser-Meyer-Olkin measure is used to verify the adequacy of sampling for factor analysis.

Latin square. A technique used to ensure that each experimental condition has an equal opportunity of occurring first, second, third etc. across an experiment.

Linear trend. Evidence of a straight line as indicated by analysis of variance.

LPUS. The problem use scale for telephone landlines has a reliability of 0.867 and had a 0.465 correlation with self-reported amounts of use of telephone landlines.

Ledermann Curve. A curvilinear relationship between alcohol availability and alcohol related harm. Sometimes spelt Lederman.

M. The mean or average. The value that minimises deviations around it.

Matroska. A multi media format for combining audio and video information.

Mbits. Megabits per second.

MCC. Mobile Country Code.

mCommerce. Business transactions that occur over the mobile phone. For example the downloading of ringtones and wallpaper, or trivia competitions.

MDS. microwave distribution systems.

mGaming. Gambling conducted on mobile phones.

MMS. Multimedia messaging service.   System for transmitting photos, pictures, video, text pages and ringtones.

MNC. Mobile Network Code .

MO. Message originating. A system for charging more than the standard rate for SMS.

MOS transistor. Metal oxide semiconductor transistor.

MP4. A multi media format for combining audio and video information.

MPEG. A family of lossy digital video compression standards and file formats. (the abbreviation is Moving Picture Experts Group). Only the changes from the previous image are stored.

MPEG-4 (formerly ISO/IEC standard 14496-2). A video compression technology for transmitting information.

MPUS. Problem use scale for mobile phones has a reliability of 0.900 and had a 0.442 correlation with self-reported mobile phone use.

MSIN. The Mobile Station Identification Number .

MT. Message terminating. A system for reverse billing SMS messages that cost more than the standard rate.

η^2. The proportion of variance accounted for by the effect. It is a measure of the strength of an effect associated with ANOVA. It is equivalent to the square of the correlation coefficient r^2.

NBCC. National Board of Certified Counsellors.

NEO-FFI. A personality inventory assessing five factors of personality (neuroticism, extraversion, openness, conscientiousness and agreeableness).

Oblimin. A technique for rotating factors, that also allows some degree of correlation between factors.

Ofcom. The British Office of Communications.

Offline. Occurring outside of the internet.

Online. Occurring over the internet.

OR. Odds ratio. Likelihood of something occurring.

Outcome. The promoter of the financial transaction (or a third party) conveys to the consumer the outcome of the proposed chance event or low skill competition.

P. The probability that the observed data are due to chance. When p<.05 this means the finding is unlikely to be an accident.

Packets. Larger signals tend to be chopped into smaller packets for transmission.

PayTV. Subscription television.

PC. Personal computer.

PCA. principal components analysis. A technique in factor analysis.

PCM. pulse code modulation

PDA. Personal Data Assistant.

PGSI. The 9 item Problem Gambling Severity Index from the larger 32 item CPGI.

Pixel.   A picture element. The basic unit of a computer display or a computer image.

Pop-ups. A pop-up is a small window, that suddenly appears ("pops up") in the foreground of the visual interface.

Premium SMS. SMS messages that are charged more than the standard rate, and hence serve as a form of funds transfer. See mCommerce.

Proposition. Essentially the promoter of financial transaction puts to the consumer a proposition, namely that considerable gain can be obtained on the outcome of a chance event or a competition involving low levels of skill.

PTSN. Public switched telephone network.

Recommenders.   Software programs that supply advice to users.

Reliability.   Measured using Cronbach's alpha and is conceptually the average inter correlation between test items. Ranges from 0 to 1, with higher values representing greater reliability.

Resolution. Based upon the outcome the consumer either loses the initial stake, or is returned the initial stake and gains some additional amount.

RGB. red, green and blue.

RPUS. Radio Problem Use Scale had a reliability of 0.824, and had a 0.472 correlation with self-reported amounts of radio listening.

SD. Standard deviation. A measure of the variability about the mean.

SE. Standard error. A measure of the stability of this estimate of the mean.

SES. Socio economic status.

SIM card. Subscriber Identity Module card.

SMS. Short message service. Text messages that are limited to 160 characters in length.

SOCOG ruling.   The failure of the Sydney Organising Committee for the Olympic Games to provide alternatives for disabled consumers on their internet ticking system elicited censure on the basis of equity and diversity laws.

SOGS. South Oaks Gambling Screen.

Spam. The abuse of electronic messaging systems (including most broadcast media, digital delivery systems) to send unsolicited bulk messages indiscriminately.

SpyTV. A perjorative term used to describe the collection and analysis of TV viewer and interactive data.

Stake. The consumer of the financial transaction hazards an amount of money upon the outcome of the proposed chance event or low skill competition.

STV. subscription television services.

TAB. Totalisator Agency Board.

Tab Mobi. System for placing bets using mobile phones.

TCP. Transmission Control Protocol.

Telegraphics. A term used to describe the collection and analysis of TV viewer and interactive data. See also SpyTV.

TIO. Telecommunications industry ombudsman.

TiVO. A digital video recording device for free to air television.

Tracking. It is common practice for most programs to record details of any activity or transactions. For example when a porn site is accessed there will be a FTP log indicated who accessed what and when.

Trivia competitions.   Competitions based upon trivia questions.   Entry into these competitions tends to be by way of premium SMS or MMS. As answers need not be correct to be eligible for a prize draw, the activity seems to be an electronic lottery.

Trust mark. A badge, image or logo found on a commercial web site that indicates the web site is a member of a professional organization or that the Web site has passed certain tests. The trustmark shows the approval and the brand of a well-known third company. The equivalent on the television would be "Brand Power" or the National Heart Foundation "tick of approval". For online gaming this could be eCOGRA or a notice that the site was subject to government regulation.

TVPUS. Television Problem Use Scale, had a reliability of 0.804 and had a 0.286 correlation with self-reported amounts of television viewing.

TVSN. A home shopping network on cable TV.

Twoway.   A provider of interactive TV applications.

UDP. User Datagram Protocol.

URL.   Uniform Resource Locator – the address of a web page on the world wide web.

US-FCC.   United States Federal Communications Commission.

Vertical integration - linking local and national databases that share common information sources to reduce redundancies or inconsistencies about people or businesses.   See horizontal integration.

VoIP. Voice over Internet Protocol.

W3C. The governing body for the World Wide Web.

Walled garden. Internet access that is restricted to specific sites such as games and Microsoft related purchases and downloads.

WAP. Wireless Application Protocol. An international standard specifically designed to allow handheld, mobile devices such as mobile phones and Personal Digital Assistants access to certain internet sites.

WAV.   Microsoft's Windows Media Video codec.

W-CDMA. Wideband Code Division Multiple Access .

White list filter. A method of controlling access to content on the internet. It only allows access to a specific list of sites.

WTO. World Trade Organisation.

19. Consumer Leisure Questionnaire

DEMOGRAPHICS

I am
male   female

I am ___ years old

I earn approximately _____ 000 dollars per annum (gross).

Please indicate your level of education
primary
secondary
technical college
business college
university undergraduate
university postgraduate

Relationship status
single   Partnership (married, defacto)

Accommodation
Living in   Paying   Paying   own house   Other

 parents' home   rental   mortgage

I usually live in the following state or territory in Australia?
ACT
NSW
NT
QLD
SA
TAS
VIC
WA
Overseas/Other

TELEVISION

Do you have cable TV (i.e. *Foxtel*; *Austar*)?
Yes/No

How many hours each week do you typically spend watching TV?
                    hours per week

How many sport programs do you usually watch each week on TV?
                    Number of

                     programs

                    per week

How many sporting events do you usually bet on in a week?
                    times per week

How many race programs do you usually watch in a week on TV (include horses, greyhounds
        and trotting)?
                    Number of

                    programs

                    per week

How many races do you bet on in a typical week (include horses, greyhounds and trotting)?
                    Number of

                    races per week

How many reality TV programs (e.g. *Big Brother*, Survivor) do you watch per week in a
        typical week on TV?
                    Number of

                    reality programs

                     per week

In a typical week how many times do you send in a vote for a reality TV program?
                    times per week

How many home shopping programs do you watch in a typical week on TV?
                    Number of

                     programs

                    per week

In a typical week, how often do you purchase products advertised on the home shopping
        programs on TV?
                        times per week

How often did you watch the late night prize shows in a typical week (e.g. *Quizmania*, *The
        Mint*, Up-Late Game Show, *Midnight Zoo*).
                        Times per week

How many times did you phone the late night prize shows in a typical week (e.g. *Quizmania*,
        The Mint, Up-Late Game Show, *Midnight Zoo*).
                        times per week

In a typical week how often do you enter SMS competitions for cash prizes offered on the
        TV?
                        Number of

                        times per week

Now please tell us whether you agree with the following statements:

I find myself watching TV for longer periods of time than I intended.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find it difficult to keep up to date on current affairs and sports, without watching TV.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself watching TV when I should be doing other things and it causes problems.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

The TV makes me feel better when I am feeling down.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself watching TV as a way of escaping from daily stresses.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

===

RADIO

How many hours a week do you usually spend listening to the Radio?
              hours per week

How many programs do you listen to in a typical week on the Radio?
              Number of
                    programs
                    per week

How many sports programs do you listen to on the Radio in a typical week?
              programs per
                    week

How often do you bet on the outcome of a sport in a typical week?
              times per week

How many races do you listen to on the Radio in a typical week (Include horses, greyhounds
       and trotting)?
              races per week

How often do you bet on the outcome of the races in a typical week (include horses,
       greyhounds and trotting)?
              times per week

How often do you phone in to a radio program to participate in a competition in a typical
       week?
              times per week

How often do you enter SMS competitions for cash prizes on the Radio in a typical week?
              times per week

Please tell us whether you agree with the following statements:

I find myself listening to the radio for longer periods of time than I intended.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find it difficult to keep up to date with current affairs and sports, without listening to the radio.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself listening to the radio when I should be doing other things and it causes problems.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

The radio makes me feel better when I am feeling down.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself listening to the radio as a way of escaping from daily stresses

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

How many hours in a typical week do you spend using the Internet for work/study related purposes?

hours per week

How many hours a week do you typically spend using the Internet for non-work related purposes?

hours per week

How many times in a typical week do you use the Internet to make purchases?

times per week

In a typical month, how many times do you use the Internet to pay bills?

times per month

How often do you use the Internet to buy Lotto tickets in a typical week?
            times per week

How often do you use the Internet to enter competitions for cash prizes in a typical week?
            times per week

How often do you use the Internet to place bets on races in a typical week?
            times per week

How often do you use the Internet to place bets on sports in a typical week?
            times per week

How often do you usually play multiplayer games on the Internet?
            times per week

How often do you typically play poker on the Internet?
            times per week

Please tell us whether you agree with the following statements:

I find myself using the Internet for longer periods of time than I intended.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find it difficult to keep up to date, without using the Internet.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself using the Internet when I should be doing other things and it causes problems.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I have used the Internet to make myself feel better when I was feeling down.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself using the Internet as a way of escaping from daily stresses.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

==

TELEPHONE (LANDLINE)

In a typical week how many hours do you spend using the telephone (landline) for work purposes?
                    hours per week

In a typical week how many hours do you spend using the telephone (landline) for personal reasons?
                    hours per week

How many times a month do you typically use the telephone (landline) to pay bills?
                    times per month

How many times a week do you typically use the telephone (landline) to buy things?
                    times per week

How many times a week do you typically use the telephone (landline) to place bets?
                    times per week

Please tell us whether you agree with the following statements:

I have used my telephone (landline) to make myself feel better when I was feeling down.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself occupied on my telephone (landline) when I should be doing other things, and it causes problems.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself engaged on the telephone (landline) for longer periods of time than intended.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

If I don't have a telephone (landline), my friends would find it hard to get in touch with me.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself using the telephone (landline) as a way of escaping from daily stresses.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

===

MOBILE PHONE

How many minutes a week do you usually spend using your mobile phone for work
        purposes?
                minutes per week

In a typical week how many minutes a week do you spend using your mobile phone for
        personal purposes?
                minutes per week

In a typical week how many minutes a week do you spend using your mobile phone to play
        games?
                minutes per week

How often do you use your mobile phone to purchase items in a typical week (e.g. ringtones,
        wallpaper)?
                times per week

How often do you use your mobile phone to vote (register preferences) in a typical week?
                times per week

In a typical week, how often do you use SMS on your mobile phone to calculate things such
        as sexual compatibility or blood alcohol concentration?
                times per week

In a typical week how often do you use SMS on your mobile phone to enter competitions for cash prizes offered in magazines?

times per week

In a typical week how often do you enter competitions for cash prizes that involve SMS that cost 55c or more a call?

times per week

Please tell us whether you agree with the following statements:

I have used my mobile phone to make myself feel better when I was feeling down.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself occupied on my mobile phone when I should be doing other things, and it causes problems.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself engaged on the mobile phone for longer periods of time than intended.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

If I don't have a mobile phone, my friends would find it hard to get in touch with me.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find myself using the mobile phone as a way of escaping from daily stresses.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

===

FINANCIAL TRANSACTIONS

I prefer to use cash for financial transactions.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I prefer to use EFTPOS for financial transactions.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I prefer to use a credit card for financial transactions.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I prefer to use internet cash (PayPal, B-Pay) for financial transactions .

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I find I use the credit on my mobile phone for financial transactions.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

FINANCIAL COMMITTMENT

I like to use a prepaid mobile phone.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I like to belong to consumer loyalty programs (e.g. Flybuys, Frequent Flyer, Community Benefit, Casino Club etc.).

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I like to subscribe to cable television networks (e.g. SkyChannel, *Foxtel* etc.).

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I prefer to visit places (e.g. Hotels, Motels) that subscribe to cable television networks (e.g. SkyChannel, *Foxtel*, etc.).

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I will only choose to stay in hotels with free Internet connections when I travel.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I frequently use Internet cafes to go online on the Internet.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

We should all take up digital television as soon as possible.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

==

PRIVACY

How often do you check your computer for viruses, spyware etc. in a typical month?
            times per month

How much SPAM do you usually receive a day?
            messages a day

How regularly do you unsubscribe to an electronic mailing list in a typical week?
            times per week

How regularly are you contacted by some SMS mailing list in a typical week?
            times per week

How regularly do you unsubscribe to an SMS mailing list in a typical week?
                    times per week

How often are you phoned by telemarketers in a typical week?
                    times per week

Please tell us whether you agree with the following statements:
I believe that complaints about telemarketers have no effect upon the numbers of unwanted
            phonecalls I receive.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I believe that unsubscribing to an electronic mailing list has no effect upon the amount of
            SPAM I receive.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

I believe that unsubscribing to an SMS is of no use at all.

I agree very much	I agree on the whole	I agree a little	I disagree a little	I disagree on the whole	I disagree very much

DISPUTE RESOLUTION
(please choose an option for each question below)
If you had a problem, or were upset about the services or content you received over the
        Internet you would contact.
a) nobody (deal with the problem yourself), b) a friend, c) a member of your church, d) the
        service provider, e) relevant industry body, f) Government regulatory body, g) other

If you had a problem, or were upset about the services or content you received over your
        Mobile Phone, you would contact.
a) nobody (deal with the problem yourself), b) a friend, c) a member of your church, d) the
        service provider, e) relevant industry body, f) Government regulatory body, g) other

If you had a problem, or were upset about the services or content you received over the
        Radio, you would contact.
a) nobody (deal with the problem yourself), b) a friend, c) a member of your church, d) the
        service provider, e) relevant industry body, f) Government regulatory body, g) other

If you had a problem, or were upset about the services or content you received on the
      Television you would contact.
a) nobody (deal with the problem yourself), b) a friend, c) a member of your church, d) the
      service provider, e) relevant industry body, f) Government regulatory body, g) other

If you had a problem, or were upset about the services or content you received on the Pay TV
      you would contact.
a) nobody (deal with the problem yourself), b) a friend, c) a member of your church, d) the
      service provider, e) relevant industry body, f) Government regulatory body, g) other

If you were having problems with your gambling, you would seek assistance from.
a) nobody (deal with the problem yourself), b) a friend, c) a member of your church, d)
      General Practitioner, e) counsellor, f) the provider of the gambling product, g)
      relevant industry body, h) Government regulatory body, i) other

Which government regulatory body would you contact if you had problems with services or
      content received over the internet, mobile phone, radio, TV or pay TV?
ACCC,
ACMA,
ADMA,
AMTA,
ASTRA,
FTV,
IARBA,
IIA,
TIO,
Don't know

PLUS the PGSI of the CPGI was inserted here.

At the next link I would be interested in seeing further information on:
a)   Regulatory bodies
b)   Counselling services
c)   Gambling
d)   Nothing