

## **Memory Failure and Decision Making: The Case of Gambling in Australia**

**William W. Bostock**

School of Government, University of Tasmania  
Hobart, Tasmania, Australia 7001  
E-mail: bostock@utas.edu.au

(Received: 14-8-12 / Accepted: 12-10-12)

### **Abstract**

For computers, memory is essential to continued operation. Similarly, the human individual's functioning is severely compromised by large-scale memory failure, which can be a characteristic of many diseases and injuries. Some views of the relationship between memory and mental process as seen by classical and modern writers are considered. Within human society, a similar relationship exists. As a case study, one can interpret gambling in Australia as an activity that can be very harmful to the individual and to society, and its continued practice requires memory failure in terms of mounting past losses. Whether the memory failure is deliberate or involuntary is a question for future qualitative research.

**Keywords:** Memory failure, collective memory, gambling, Australia.

### **1. The Concept of Memory**

The concept of memory has fascinated philosophers and artists for thousands of years, but the invention of the computer has brought renewed interest to the subject, as the computer provides a model of the human brain. A computer has an operating system on which it runs. Every computer must have an operating system to run other programs. Operating systems perform basic tasks, such as recognising input, sending output, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers. For large systems, the operating system has even greater responsibilities and powers. It is like a traffic police officer— it ensures that different programs and users running at the same time do not interfere with each other. The operating system is also responsible for security, ensuring that unauthorized users do not access the system. When the computer is operating, one could say that it has a mental state, similar to consciousness.

Computers also need memory to operate, or be able to store and retrieve information. Every computer comes with a certain amount of physical memory, usually referred to as main memory or RAM. One could think of main memory as an array of boxes, each of which can hold a single byte of information. A computer that has 1 megabyte of memory, therefore, can hold about 1 million bytes (or characters) of information. Human memory has been estimated to contain about two hundred megabytes (MERKLE, 1989: 1).

## 2. Human Memory

The term 'mental process' refers to the thought processes, memory, mood, cognitive state and energy level, and the condition of the mental process at any particular time is the mental state, whose examination is an important tool of psychiatry (PURI, LAKING & TREASADEN, 1996: 60–72). Again, the metaphor of the computer has relevance, and attempts have been made to quantify the thought process in terms of speed and energy used. In one estimate, the speed has been calculated as 1015 synapses operating at 10 impulses/second, giving 1016 synapse operations per second (MERKLE, 1989: 2).

Any impairment of memory will affect mental process significantly, thus it is possible to describe the intersection between memory and mental process as extremely busy and potentially at high risk of failure. Quite a significant amount of research has been carried out to assess this relationship. For example, Berthon, Pitt and Ewing (2001) concluded that memory development is necessary to enable learning from experience and sorting and identifying successful practice (BERTHON, PITT & EWING, 2001: 146).

Memory is not necessarily conscious. Animals can store data over time with a capability of retrieval that reaches its highest form in humans, whose memory is greatly complex and subtle, including images, symbols, sensations and sequences. Human memory retrieval is imperfect, as many memories are forgotten and some are repressed or kept in the unconscious. Human memory is believed to reside in molecules, synaptic junctions, whole cells or cellular circuits within the brain, but the search for the *engram* or basic unit of memory, believed to be a biochemical change, has proven elusive.

In comparison with computer memory, human memory is not very large, but it is qualitatively different in that it is richly intuitive and deeply affected by phylogeny. *Phylogeny* (or phylogenesis) is the origin and evolution of a set of organisms, usually species. *Phylogenic memory* is the memory relating to being part of a species, and presumed universal in all individuals, reflecting an earlier phyletic stage. Some psychologists, such as Reber, are critical of the concept, but Reber gave it some grudging acceptance: 'phrased in this way [as above] it is a rather empty concept; if one recasts the idea into the framework of species-specific behavioural tendencies, it is not quite so bizarre' (REBER, 1995:569).

## 3. Human Memory and Mental Process

The great French novelist Proust showed that a literary grasp of memory could be even more powerful than the scientific. Proust was concerned to show that human memory is fallible. In his view, memory expels from its conscious cells all unpleasant or unbearable elements. Memory attempts to sort out what should be remembered and what should be forgotten, but it often fails to do this, even with happy events. Yet, Proust showed that in spite of its faults and weaknesses, memory is a marvellous instrument that can revitalise events and facts that appear to have been totally forgotten, and it can do this independently of will. Various examples of this resuscitation are presented in his work *In Remembrance of Things Past*, such as the famous Madeline (cookie) incident, during which a cookie brings back a flood of memories, or the uneven stones in the yard at Guermites Hotel, which recreates a memory of the city of Venice and provokes an immense sense of joy in the narrator's heart. Memory is thus in Proust the link between past and present, and when that link is deficient, there are consequences. The mechanism for managing the interaction between memory and mental process that Proust suggested was habit. Habit has analgesic effects (PROUST, 1954, I: 671). Habit allows people to accept death and tragedy, and to go on with life. Going on living after the death of a loved one is made possible by habit, as in, for example, the habit of eating.

The American philosopher James proposed at least two types of human memory. The first type of memory as defined by James was *primary memory*, or short-term memory, lasting only a matter of seconds. Primary memory consists of successive events in our environment that is taken in by all the senses and result in a continuous experience. Material in primary memory has not yet left consciousness. James defined a second type of memory as *secondary memory*. This consists of long-term memory that is held indefinitely and does not reside in consciousness, but can be brought to consciousness by the effort of remembering (JAMES, 1950: Ch 16).

Memory affects mental process through mental state, and there are memories of mental states, which can affect future action. During a lifetime, there will be accumulations of memories of desired or undesired mental states, and here the term '*psychic capital*' was introduced by Boulding (1950). *Capital* is an accumulation of wealth, and with *psychic capital*, the accumulation is one of desirable mental states, which admittedly are highly transitory in nature. The mental states could be memories of pleasure, success, achievement, recognition, and the desire to add to psychic capital is likely to be a powerful motivating force. Exchanges involving increases or decreases of psychic capital are likely to occur at any time, either through decision or through the turn of events. Failure in a task could also lead to a depletion of psychic capital through an accumulation of negative memories of failures, disasters, atrocities, or perceived injustices and indignities (as either recipient or perpetrator). While in business these undesirable depletions would be called *liabilities* or *deficits*, they could also be called *negative psychic capital*. The desire to avoid *negative psychic capital* can also be a powerful motivating factor, processed by denial or suppression.

#### **4. Memory and Mental Process: The Collective Level**

Maurice Halbwachs (1877–1945) presented a detailed analysis of the relationship between individual memory and social or collective memory. For example, an individual will clearly remember his or her first day at school while a teacher, who was present at the same occasion, may not remember anything of that day. Although an individual may forget a particular remembrance, many remembrances can be recalled by a group, and therefore form a system of interconnected and mutually supporting remembrances (HALBWACHS, 1980: 30). As this group will be distinct, it is possible for an individual to be simultaneously a member of a number of groups, each with its own collective memory. An individual's memories are often collective in origin, even though an individual may be completely unaware of their origins, which may be a newspaper, book or conversation. Where an individual is a member of social groups with differing opinions on a particular issue, the prevailing view within an individual will reflect the intensity of the respective group views (HALBWACHS, 1980: 45). Collective memory is actualised through individuals, but because of the multiplicity of different and often competing sources, the outcome of societal memories will reflect a combination of influences, which may be very complex and beyond the control of individuals. Collective memories will present themselves as systems of waves, originating from different mental and physical milieus, so that individual consciousness will register as an intersection point in which the flow of individual remembrances, even most personal ones, is always explained by changes occurring in our relationship to various collective milieus (HALBWACHS, 1980: 49). Halbwach's work emphasised the selectivity and plasticity of memory. The effect of time on collective memory is most important. Here, Halbwachs refers to some French citizens who settled in Algeria early in the nineteenth century and whose later ideas and customs were maintained at those current at the time of their settlement. However, many remembrances are reconstructions, often based on false recognitions through stories and testaments. Significant events of national importance help to fix memories, but even so, collective memory and history can be in opposition. Thus, to Halbwachs, collective memory is of fundamental importance to continued social life, but it is a highly manufactured phenomenon subject to engineering. It always works through individuals, but individuals are subject to the influence

of more than one collective memory. Even extinct groups will leave a trace of memory in the collective memory of later groups, the concept of the *trace* being compatible with the concept of the phytogenic memory, though Halbwachs does not explore the concept of the unconscious memory. His position is that, in reality, the thoughts and events of individual consciousness can be compared and relocated within a common time because inner duration dissolves into various currents whose source is the group. The individual consciousness is only a passageway for these currents, a point of intersection for collective times (HALBWACHS, 1980: 125).

Collective memory is also shaped by present identity, whereby certain remembrances are deliberately selected as acceptable representations of the past (LARVARBRE, 2001: 1). This can be as an official collective memory: an example of this being the French Communist Party, which, prior to the ending of communism in Eastern Europe, claimed to be capable of promoting and controlling collective memory. Lavarbre defines collective memory as an interaction between memory policy or historical memory and common recollection, or common memory, of common experience. Collective memory involves a homogenisation of representations of the past and it can be an effect of the present or an effect of the past. It can also be beyond volitional control, an example of this being the emergence of the concept of the *Vichy syndrome* (LAVARBRE, 2001: 2).

Memory is thus vitally important in human organisation because it provides storage and retrieval of information necessary for effective decision making and therefore the continued existence of organisations including communities and whole societies. It also functions to maintain those parts of collective memory that are the basis of identity, which in turn is necessary for health and survival. Memory is fundamental to mental process, but as well as being a property of individuals, it is a property of groups. The failure of memory can thus allow the continuation of activity, even, or particularly, when it can be harmful to the community or to the individual, as becomes clear when considering the impact of pathological gambling in Australia.

## **5. The Extent of Gambling in Australia**

Legal gambling accounts for one and a half per cent of Australia's Gross Domestic Product, which was a total net expenditure, (that is, net loss) of AU\$14.37 billion in 2001/2002, or AU\$988 loss for every adult (ELLCOTT, 2002: 3). In 1997–98, the total amount staked was AU\$95 billion, of which AU\$3.5 was taken as taxation. Expenditure on gambling has tripled in recent decades and a major social transformation has taken place, mostly fuelled by the introduction of electronic gaming machines (EGMs), as shown in an official report by the Productivity Commission (PC) (PC, 1999: 8–9).

Eighty two per cent of adult Australians engage in gambling, excluding raffles and sweeps—the highest extent of gambling in the world—where the annual loss is at least double that of North America or Europe (PC, 1999: 12). At the end of the twentieth century, Australia had 185,000 EGMs, which, on a per capita basis, is five times more than the United States (PC, 1999: 11). This huge social and economic revolution involving massive losses to the community and the individual could not take place without large-scale memory failure.

## **6. The Motivations to Gamble**

As a service industry, gambling gives enjoyment, provides an accessible, comfortable and safe environment, provides employment, and generates taxation revenue. The industry directly employs 37,000 people and indirectly another 70,000, mostly in clubs and pubs. Tourism is a beneficiary of the gambling industry, and of the total loss on gambling of AU\$11.3 billion in 1997–98, AU\$0.5 billion was lost by overseas visitors (PC, 1999: 9). In

addition, gambling now accounts for 12 per cent of state and territory taxation revenue. However, in studies on the diverse motivations for Australian gamblers, it is clear that memory of losses provide little disincentive.

**Table 1:** The Motivation for Gambling

Motivation	Percentage of respondents
Dream of winning	59
Social reasons	38
For charity	27
Atmosphere/excitement	13
Belief in luck	12
Favourite activity	10
Beating the odds	9
Boredom/pass the time	9

(Source: MORGAN, 1999, in PC, 1999: 15).

These survey results confirm the artistic presentation of gambling as a glamorous and exciting activity where mundanity can be replaced in a way that can only be dreamed of—an image reinforced by much classic literature and many films such as *La Baie des Anges* or *Croupier*, to name just two.

Gambling is for most people a rational choice, a decision to invest in the totally comprehensible desire of winning a big prize for a small investment, and the dream of the possibility of a transformed future, far removed from one's present surroundings. This activity may be aided by subsidised food, drink and entertainment, and take place in a timeless encapsulated environment where clocks, windows, day, night, public holidays, the seasons and other signifiers of time and other place such as the presence of children or the impact of world events have been excluded. This causes one to consider whether gambling can provide release in a collective sense in addition to that for individuals but requiring sustained memory failure as to past losses. Many casinos operate on a 24-hour/365-day per year basis, (though curiously this is not so at the famous Monte Carlo casino), thus that unawareness of the passage of time may help in the failure of memory.

## 7. The Implications of Gambling for the Individual

For a person who has difficulty in controlling his or her gambling behaviour, with resultant adverse personal, economic and social impacts, the term 'problem gambler' is generally used, as for example by the Australian Productivity Commission. At precisely what point a recreational gambler becomes a problem gambler is not clear. Some of the questions posed in the South Oaks Gambling Screen (SOGS) (LESIEUR & BLUME, 1987) about the gambler's behaviour concern whether they chase losses, feel guilt, and believe that they have a problem, with a score of 5 or more indicating acceptance as a *problem gambler* (PC, 1999: 20).

The American Psychiatric Association have created in the Fourth Edition of their *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), a test for what they call *Pathological Gambling*, which they define as a Disorder of Impulse Control, one of the wider spectrum of Obsessive-Compulsive Disorders. This test has greater emphasis on the psychological aspects of the gambler's behaviour, such as preoccupation with gambling, the need to gamble with increasing sums of money to achieve the desired level of excitement, failed attempts at control or cessation, gambling as a way of escaping dysphoria, 'chasing' losses, lying about

gambling, committing crime to finance gambling, and jeopardising or losing a relationship, job or career (KORAN, 1999: 228).

Three stages in the development of the condition of pathological gambling have been identified: the 'winning phase', the 'losing phase', and the 'desperational phase'. Of these, the latter is the phase of most acute danger, as the gambler will have intense dysphoria, anxiety and alienation, and commonly suicidal ideation. Resort to crime is a possible outcome; types of crime involved commonly include drug pushing, forgery, fraud, embezzlement for men and prostitution for women, though violence against persons is rare (KORAN, 1999: 229–30).

The pathological gambler will hold irrational and overvalued beliefs about gambling, and may believe that he or she can have some influence over winning outcomes, or that a run of bad luck must soon end, or that Lady Luck can be influenced (KORAN, 1999: 231).

Pathological gamblers are often found to have co-morbidity: in one study, 76 per cent were found to have major depression, 36 per cent to have drug and alcohol dependence, and 12 per cent to have made potentially lethal attempts at suicide (KORAN, 1999: 232–3). The common theme in these conditions is memory failure, which, when occurring at the time of decisions to gamble, can be disastrous.

## 8. The Implications of Gambling for Society

In Australia, an estimated one per cent of the adult population (130,000 people) are believed to have severe gambling problems, with another 1.1 per cent (163,000) experiencing moderate problems (PC, 1999: 19). The problem gamblers contributed an estimated one-third of total gambling expenditure, that is, about AU\$3.6 billion annually, an average of AU\$12,200 per gambler, causing harm to an estimated 250,000 adults (PC, 1999: 21). The national Gambling Survey identified a number of specific adverse impacts over a 12-month period. The most significant of these were:

**Table 2: The Impact of Gambling**

Impact of Gambling	Number of People
Depression	70,500
Adverse job performance	49,200
Break-up of relationship	39,200
Serious consideration of suicide	12,900
Crime (excluding cheque fraud)	9,700
Attempted suicide	2,900
Completed suicide	35–60

(Source: PC, 1999: 26).

The estimated annual cost to Australia of gambling-related depression and suicide is estimated to be between AU\$502 million and AU\$1,230 million, with a total adverse impact (including bankruptcy, loss of productivity, separation and divorce, policing and justice) of between AU\$1.2 billion and AU\$4.3 billion (PC, 1999: 32). This figure must be set against the net benefit of the gambling industry, estimated annually in Australia to be between AU\$4.4 billion and AU\$6.1 billion (PC, 1999: 32).

Interesting as the attempts to quantify the implications of gambling are, the qualitative harm is very difficult to assess. Is gambling contributing to a breakdown of social fabric, also called *social capital*, that is, the layer of trust, support and engagement between the members of communities (PUTNAM, 1995)? It has already been noted that gambling has increased, and

as availability increases, the total amount of gambling activity can be predicted to increase (JACQUES, LADOUCEUR & FERLAND, 2000).

## 9. Conclusion

The above discussion has shown the harmful effects of memory failure on computers and humans including human society. In the case of Australia, one can interpret gambling as a activity that can be very harmful to the individual and to society, and its continued practice requires memory failure regarding mounting past losses. Whether the memory failure is deliberate or involuntary is a question for future qualitative research at a multidisciplinary level involving the participation of psychologists, philosophers, political scientists and other social scientists, combined with the insight of artists and other literary people.

## References

- [1] American Psychiatric Association, APA advisory on internet gambling, (2001), Retrieved from [http://www.psych.org/news\\_stand/internetgamblingadvisory11601.pdf](http://www.psych.org/news_stand/internetgamblingadvisory11601.pdf).
- [2] P. Berthon, L.F. Pitt and M.T. Ewing, Corollaries of the collective: The influence of organizational culture and memory development on perceived decision-making context, *Journal of the Academy of Marketing Science*, 29(2) (2001), 135-150.
- [3] K.E. Boulding, *A Reconstruction of Economics*, (1950), New York, NY: Wiley.
- [4] J. Ellicott, Pokies top gambling losses of \$14 bn, *The Australian*, (2002).
- [5] Gamblers Anonymous, Official home page, (2002), Retrieved from <http://www.gamblersanonymous.org/>.
- [6] M. Halbwachs, *The Collective Memory*, (1980), New York, NY: Harper Row.
- [7] J. Halliday and P. Fuller, *The Psychology of Gambling*, (1977), Harmondsworth, UK: Penguin.
- [8] Handelsmann, Australia's legal approach to internet gambling, (2001), Retrieved from <http://www.gigalaw.com/articles/2001-all/handelsmann-2001-09-all.html>.
- [9] C. Jacques, R. Ladouceur and F. Ferland, Impact of availability on gambling: A longitudinal study, *Canadian Journal of Psychiatry*, 45(9) (2000), 810-815.
- [10] W. James, *The Principles of Psychology*, (1950), (volume 2), (1890), New York, NY: Dover Publications.
- [11] L.M. Koran, *Obsessive-Compulsive and Other Disorders in Adults, A Comprehensive Clinical Guide*, (1999), Melbourne, VIC: Cambridge University Press.
- [12] M.C. Lavabre, For a sociology of collective memory, (2001), [http://www.cnr.s.fi/cw/en/pres/compres\\_~memoixe/lavgtbre.ht](http://www.cnr.s.fi/cw/en/pres/compres_~memoixe/lavgtbre.ht).
- [13] H.R. Lesieur and S.B. Blume, The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers, *American Journal of Psychiatry*, 144(9) (1987), 1184-1188.
- [14] R.C. Merkle, How many bytes in human memory? (2006a), Retrieved from <http://www.merkle.com/humanMemory.html>
- [15] R.C. Merkle, Energy limits to the computational power of the human brain, (2006b), Retrieved from <http://www.merkle.com/brainLimits.html>
- [16] J. Orford, *Excessive Appetites: A Psychological View of Addictions*, (1985), Chichester, UK: John Wiley and Sons.
- [17] Productivity Commission, Australia's gambling industries, (1999), Retrieved from <http://www.pc.gov.au/inquiry/gambling/finalreport/index.html>, Australia.
- [18] R.D. Putnam, Bowling alone: America's declining social capital, *Journal of Democracy*, 6(1) (1995), 65-78.