The International Journal of
WHOLE PERSON CARE
VOLUME 4 ● NUMBER 1 ● 2017 ● 32–50

THE FREEDOM VS HEALTH PARADOX

Craig Hassed
Faculty of Medicine, Nursing and Health Sciences, Department of General Practice, Monash University, Australia
craig.hassed@monash.edu

ABSTRACT

We all want to be free but freedom is both an outer and an inner state. For example, we want to be free of the suffering brought about by external factors such as oppression, bullying, injustice, discrimination, deprivation and illness. We also want to be free inwardly in the sense of being free of the suffering brought on by internal factors such as worry, anxiety, fear, depression, obsession, compulsion, addiction and attachment. There may however be a paradox in our pursuit of freedom in that we tend to pursue the former without paying much attention to the latter. As a result we may find the opposite of what we seek – freedom, health, happiness – because outer freedom is actually dependent upon inner freedom.

In this article we will explore how unfettered freedom is central to the causation of poor mental and physical health whereas, paradoxically, freedom, health and happiness are brought about by discipline, reason, restraint and setting limits.

KEYWORDS: Healthcare, Lifestyle, Mindfulness, Chronic illness, Addiction

INTRODUCTION

We all want to be free but freedom is both an outer and an inner state. For example, we want to be free of the suffering brought about by external factors such as oppression, bullying, injustice, discrimination, deprivation and illness. We also want to be free inwardly in the sense of being free of the suffering brought on by internal factors such as worry, anxiety, fear, depression, obsession, compulsion, addiction and attachment. There may however be a paradox in our pursuit of freedom in that we tend to pursue the former without paying much attention to the latter. As a result we may find the opposite of what we seek – freedom, health, happiness – because outer freedom is actually dependent upon inner freedom.

In this article we will explore how unfettered freedom is central to the causation of poor mental and physical health whereas, paradoxically, freedom, health and happiness are brought about by discipline, reason, restraint and setting limits.

FREEDOM THROUGH NON-ATTACHMENT

> *"Attachment leads to suffering. … To be free from suffering, free yourself from attachments."* Buddha

Hunters have a simple method for catching monkeys.[1] The hunter digs a hole with a narrow opening in the side of an anthill while in view of the monkey. Inside the hole he places some food. The hunter steps away and waits behind a tree. The monkey is curious and when the hunter is at a safe distance then it approaches the hole. It notices the food and squeezes its hand through the narrow opening, grabs the food but in doing so makes a fist. As a result the monkey can no longer extract its hand from the hole and believes it is trapped. The monkey screams and the hunter calmly walks over to capture it. If the monkey had let go of the tasty treats it would have been free. How silly is the monkey we may well think, but this story is as much a parable as it is a set of instructions on how to catch monkeys. We are the monkey in that we get attached to things all the time. We just won't let go even when it is doing us harm, or perhaps it would be truer to say that in our distracted and distressed state we mostly don't even realise we are hanging on in the first place.

We get attached to things all the time, for example our possessions, status, family, friends, religion, nationality, football team, and wealth as well as our opinions, ideas about ourselves and others, emotions, and physical pleasure or pain. It is not that any of these things are necessarily bad in themselves, but just that attachment to them has significant implications. For example, if attached to a possession we experience anxiety or grief in response to the potential or actual loss of it. If attached to our nationality then we may well ignore or justify the injustices committed by our own nation on those of other nationalities. If attached to an opinion then we may feel personally threatened if it is challenged or defend it even when we

know in our hearts it is wrong. If attached to something pleasurable then we may find ourselves indulging it well beyond the point where it is healthy. If attached to pain then we may find ourselves avoiding things that are healthy because they involve some exertion or discomfort. Words, of course, can have different meanings. Attachment, in the meaning implied above, is different to the 'attachment' of having an emotional connection to someone, like a child to a parent. This is a healthy kind of attachment and forms the emotional and social bonds within families and society, whereas the former kind of attachment is a common source of division and conflict between people.

To understand the potential cause of this problem and the implications for health it would be worthwhile considering a basic overview of the human psyche and neuroscience.

THE NEUROSCIENCE OF WELLBEING

In broad terms, the three main aspects of the human psyche with corresponding areas in the brain each vying for authority were described by Socrates around 2,500 years ago.[2] He believed they had a natural order and called them the reasoning (higher) element, the emotive (middle) element and the appetitive (lower) element. They have their own distinct roles and are constantly interacting with each other. Socrates and his pupil Plato may have been ahead of their time, but from a modern neuroscience perspective, these three regions are the:

1. prefrontal cortex - relating to higher (executive) functions.
2. limbic system - relating to emotions.
3. mesolimbic reward system – dopaminergic circuits relating to appetites and instincts.

The emotionally intelligent, reasonable, sociable, happy, harmonious, healthy and high functioning human being has well integrated these three elements of the psyche. Executive functioning is there to regulate, not suppress, the other two functions and include working memory (the ability to hold and process information), decision-making (the ability to apply reason and information to a situation), self-awareness (the ability to objectively observe one's own mind, body and behaviour), emotional-regulation (the ability to regulate rather than be dominated by emotions), impulse control and appetite regulation (the ability to regulate rather than be dominated by appetites). This, from a neurological perspective, is self-mastery.

The executive functioning centres are the last areas of the human brain to fully develop from late adolescence to early adulthood. Although culture, environment and upbringing have an independent effect, it is also biologically determined that this process occurs more slowly in males than females[3] which explains the relationship between young males, impulsivity and bad behaviour especially in those brought up in abusive or unregulated home environments[4]. The brains of adolescents brought up in such environments, especially males, are predisposed for anti-social behaviours in later life because of overstimulation of the brain's stress centre (the amygdala within the limbic system) and underdevelopment of the prefrontal

cortex.[5] As a result they are primed for aggression as well as learning, social, behavioural and physical and mental health problems later in life.[6,7,8] This emphasises the need for children to learn strategies for self-awareness and self-regulation if they are to avoid being trapped by their own compulsions and emotional reactions later in life. But are we trapped by our neurology, or are we masters of it?

NEUROPLASTICITY

In the last two decades our understanding of the brain has gone through a major revolution. Established dogma was that once wired in childhood the brain did not significantly change apart from losing neurons as we age which suggests that we are prisoners of our neurology. Now it has been well established that the brain is rewiring itself right throughout life giving us more scope for change than previously realised. Everything we think, do, or say activates the corresponding neural pathways stimulating further neuronal connections (neuroplasticity) and new brain cell growth (neurogenesis). Circuits that are not being stimulated are pruned back. Our neurology can limit us but it does not completely define us. Neuroplasticity can work for or against us depending on what we choose to practice or cultivate within our nature. Cultivating useful thoughts, attitudes and behaviours makes them easier to think and do but that is equally true for unhelpful thoughts and behaviours. The longer they are engrained the more deeply they etch themselves into our neurology and the more we become constrained by those patterns until they become habits or 'second-nature'. This has major implications for lifestyle-related chronic illnesses.

We are capable of developing greater self-awareness and control. In an interesting study[9] a multifaceted mindfulness-based intervention for young adults led to substantial and enduring improvements across multiple cognitive and neuroimaging measures including substantial improvements in physical health, working memory, performance, mood, self-esteem, self-efficacy, mindfulness, and life satisfaction. Improvements in mindfulness were also associated with changes in the insula – an area of the brain which is very important for regulating appetite, habit and addiction – and the executive control network.

SELF-MASTERY: WHICH PART OF THE SELF SHOULD RULE?

We often think of the psyche as being one single thing but there are a number of aspects to it, each vying with the others for ascendency. The three principles within the soul, psyche or human nature are; first, the higher being the intellect or reasoning element with which we are wise; second, is the middle being the emotive element with which we are courageous or show resolve; third, is the lower being the appetitive or pleasure-seeking element with which a person has physical desires. For the unwary, freedom and happiness are synonymous with giving full rein to the pleasure-seeking or appetitive level of the psyche. But, for the ancient Greeks, as for other great wisdom traditions around the world, the harmoniously ordered psyche was intimately associated with the rule of reason. This is self-mastery and the source of an harmonious, healthy and just life.

> *"But in reality justice was ... concerned not with the outward man, but with the inward, which is the true self and concernment of man: for the just man … sets in order his own inner life, and is his own master and his own law, and at peace with himself; and when he has bound together the three principles within him, which may be compared to the higher (reason), lower (appetite), and middle (emotion) notes of the scale … and is no longer many, but has become one entirely temperate and perfectly adjusted nature, then he proceeds to act, if he has to act, whether in a matter of property, or in the treatment of the body, or in some affair of politics or private business; always thinking and calling that which preserves and cooperates with this harmonious condition, just and good action, and the knowledge which presides over it, wisdom, and that which at any time impairs this condition, he will call unjust action, and the opinion which presides over it, ignorance."*[2]

Pleasure feels good but without adequate appetite regulating and if we pursue it as if it is synonymous with happiness (the hedonic disposition to happiness) then we need a greater amount of it to get the same burst of dopamine as the time before. It is very habit forming and ultimately can lead to many and varied illnesses and addictions. Thus reason or wisdom is meant to govern and regulate a well-ordered psyche and to make decisions based on what is reasonable, necessary and healthy. This is the path to remaining free from internal compulsions, addictions and unrestrained appetite, which doesn't mean that the appetites are never enjoyed, but they are not indulged past what is healthy or appropriate. The emotive element is meant to support the decisions of the reasoning element. Hence we speak highly of a person who has 'strength of will' or the 'courage of their convictions' in that they can hold firm and are courageous in the face of temptation and adversity.

There is however clearly an interaction between the individual and their environment. Personal will and responsibility does not function independently from the environment which can make it easier or harder for a person to make and maintain healthy and reasonable decisions. That is why social policy and reasonable regulations are also required to limit exposure to unhealthy stimuli and to create an environment in which it is easier to make healthy decisions. This emphasises the need for executive functioning on a large scale. Just as an individual can be ruled to their detriment by the temptations of the hedonic principle, so too can a community. This has been the cause of many a bad law.

There is nothing wrong with the appetitive element in itself. Without it we wouldn't physically survive as a species because we wouldn't eat, procreate, or avoid pain if it were not for the promptings of this appetitive, pleasure-seeking, pain-avoiding aspect of human nature. The key issue is that the appetitive element is not meant to rule our decisions and actions but to pass them by the executive functioning, reasoning element. If reason dictates that it is entirely appropriate to do something pleasurable, particularly if it aligns with what is also healthy, then it is, as it were, permission is given. Equally reason might dictate that it is appropriate to forgo a pleasure, like not having a second helping of dessert, or do something uncomfortable, like

exercising, even in the face of our brain's pleasure-centre protesting every step of the way. Clearly the human psyche has a seemingly limitless capacity for self-deception and it requires every more highly developed mindfulness skills to discern between the rationalisation of pursuing unhealthy desires and the justifications for avoiding health ones.

It is easy to get attached to the things we find pleasurable but self-regulation through non-attachment is not so much about trying to suppress or control appetites but rather not being controlled by them. With suppression there is attachment and a constant and exhausting internal battle to control the desires whereas with non-attachment it is liberating because we can observe the desire without being influenced by it. This is easily said but requires a lot of practice to master.

Lifestyle-related illness and the need for moderation

The current healthcare system dominated by a reductionist and interventionist philosophy has become increasingly expensive, complex and at times harmful. In a study published in the BMJ it found that somewhere between 251,000 to 400,000 people die each year in the USA as a result of medical errors.[10] Although it can also do a lot of good, as it is currently practised, it is clearly not the solution to the problems of chronic illness.

Our ability or inability to self-regulate lifestyle factors and appetites is of central importance for the lifestyle-related diseases and addictions which are so much a part of modern life. If ruled by the appetitive element in opposition to the promptings of executive functioning then physical and mental disease naturally follow sooner or later depending on our genetic constitution.

There is a simple rule of nature and that is we can have what we want but we get what comes with it. The apparent freedom associated with a lack of restraint comes at a heavy cost, one that few are conscious of or are prepared to pay willingly. On the other hand, the apparent restriction of freedom associated with reasonable, healthy restraint comes with a bonus, one for which we are increasingly thankful as life goes on.

The development of self-restraint starts early in our upbringing. In a famous series of experiments on young children, scientists put a marshmallow in front of them and told them they would be left alone for a while. The scientist explains that if the child has not eaten the marshmallow by the time the scientist returns they can have another one as well.[11] Some children could restrain themselves but most, though they tried, couldn't. Interestingly, when they followed the children up as young adults they found that those who could restrain themselves as children performed far better on college entrance scores,[12] overall educational attainment[13], body mass index (BMI) [14], and the ability to cope with frustration and stress.[15] Another experiment demonstrated that a preschool child's attention span-persistence is strongly associated with

later school achievement and college completion.[16] Children who were rated higher than average at age 4 had nearly 50% greater odds of completing college by age 25. Simple developmental disciplines like self-restraint and maintaining attention are so important but these days, in the name of freedom, it is more common to see social attitudes, media, environment and upbringing foster a lack of self-restraint and shorter attention spans. Paradoxically, the short-term happiness that comes with no restraint leads to a long-term health burden. Conversely, the short-term unhappiness that comes with restraint leads to a long-term wellbeing.

To illustrate, a German population-based study[17] on people aged 35-65 years looked at the eight-year reduction in the relative risk of developing major chronic diseases like cardiovascular disease, diabetes, and cancer associated with four healthy lifestyle factors – never smoking, a BMI < 30, 3.5 hours / week or more physical activity, and a healthy diet (adequate intake of fruits, vegetables, and whole-grain bread and low meat consumption). The relative risk for developing a chronic disease decreased as the number of healthy factors increased such that compared with people with none of these healthy factors, if a person had all four healthy factors at baseline they had an overall 78% lower risk of any chronic illness, specifically a 93% lower risk of diabetes, an 81% lower risk of myocardial infarction, a 50% lower risk of stroke, and a non-statistically significant 36% lower risk of any form of cancer, 36%. A UK study followed men[18] aged 45-59 years over a 30-year period. These are the five healthy behaviours they identified as being integral to having the best chance of leading a disease-free lifestyle.

1. Not smoking / ex-smokers
2. BMI: 18 to 25 Kg/m2
3. Diet: three or more portions of fruit and/or vegetables a day together with less than 30% of calories from fat
4. Physical activity: ‘vigorous’ exercise described as a regular habit
5. Alcohol: three or fewer standard drinks per day

Over that 30 years, men who followed four or five healthy behaviours had half the risk for diabetes and vascular disease and a delay in vascular disease events up to 12 yrs. They also had a third reduced risk of any cancer, a 60% reduction in dying from any cause and a two-thirds lower risk of dementia. Unfortunately lifestyle-related problems are only going to get worse because of factors like obesity as a result of physical inactivity, poor quality food and overeating. Across the world the prevalence of obesity increased from 3·2% in 1975 to 10·8% in 2014 in men, and from 6·4% to 14·9% in women.[19] In some countries adopting Western lifestyle more than half the population are obese and the costs, socially, economically and medically will be felt for generations to come.

RESTRAINT VERSUS REGULATION

Reasonable restraint should not be confused with deprivation. Self-restraint is about knowing when to stop rather than being compelled by unhealthy impulses, addiction and habit. The problem with restraint is that it is not so easy. Commonly there is a gap between what we know is good for us, and what we do where we know something is good for us but we don't do it, or know something is not good for us but we keep doing it anyway. Bridging that gap between knowledge and action requires work on psychological, social and environmental levels. Considering obesity, being regularly exposed to overly sweet foods in our upbringing creates an addiction derived from the brain's dopamine pathways very similar to that seen in substance abuse.[20] The brain's dopamine-based reward circuits keep craving the reward and, from an epigenetic perspective, genes that regulate the brain switch themselves towards reinforcing that behaviour. Oblivious to what is happening within and around us, we become a genetic, psychological and environmental prisoner to something that is doing us damage. How appealing to do what we want, how sweet the taste, but how bitter the trap. This also explains the increasing addiction to mobile devices seen especially among young people these days.[21]

Environment has a strong but subtle influence in that it is much harder for individuals to act reasonably and moderately if their social and/or home environments constantly pull them back to old, unhealthy behaviours. For example, lower socioeconomic groups are targeted by gambling, fast food and alcohol outlets far more than those from higher socioeconomic groups. This explains in large part the inequities in health status between the wealthy and less wealthy members of the community.[22,23] Unregulated advertising and commercial environments leave many of the most vulnerable people in the community even more at risk. Paradoxically, reasonable regulation of advertising and availability is not about limiting freedom but promoting it by helping people to be free of the subtle manipulation and addiction that comes with a lack of individual and community regulation.

BEING ADEPT AT CHANGING HABITS

Enabling strategies empower us to act upon conscience, healthy advice and knowledge. They include enhancing motivation, mindfulness skills, stress management, self-awareness, self-efficacy, and the internal locus of control. Changing established unhealthy habits is not easy. If we want to be 'adept' at making healthy change in life then the following acronym might be helpful.

- **A**ttention: we are prisoners of habit when on automatic pilot. We have to pay attention to act in non-habitual ways.
- **D**ecision: unless we are motivated and have made a clear decision to do things differently then we just keep reverting to the old behaviour. It has to be our decision, not someone else's.

- **E**ffort: it takes effort to do things the non-habitual way. Unless we are prepared to put in effort we will not change.
- **P**erseverance: we have to persevere again and again until the brain establishes new pathways to support the new behaviour.
- **T**olerance: we have to be prepared to tolerate the discomfort that comes with doing something new but once the brain rewires the new behaviour it becomes more comfortable.

EPIGENETICS AND FREEDOM FROM GENETIC DETERMINISM

Like the brain, genetics were once viewed in a deterministic way but now we understand that although our genes don't change by and large from what we inherit at conception, they constantly change in terms of genetic expression. We have now moved beyond genetics and into the age of 'epigenetics'. We may have been dealt a genetic hand but we have a choice in how we play that hand.[24]

The complex chemical network around our chromosomes is in constant interplay with mind, body and environment which changes various genetic levers and switches activating some genes and silencing others. A genetic disposition for a particular illness may or may not play out depending on lifestyle, mental health, and environment. We have more scope to modify the way our genes express themselves than we may realise.

Choosing poorly may leave us the victims of our genetic risks and has implications for future generations because once a gene changes its expression then those changes can be passed from generation to generation in what is called the 'transgenerational' effect. To illustrate, data gathered in 1890, 1905 and 1920 from people in Overkalix, a remote town in northern Sweden, was re-examined some years later by Lars Bygren. Byrgen had originally explored whether children's nutrition during the slow-growth period (9-12 years old) affected their future grandchildren's growth and life expectancy.[25] He looked at the family's access to food during times of famine and plenty and found a higher risk of early death and shorter life expectancy in the grandchildren if there was an abundance of food when the paternal grandfather was a 9-12 year-old boy. Much of the early death was attributable to metabolic and lifestyle-related diseases like diabetes and heart disease but death from all causes was also increased. If, on the other hand, food was scarce during the slow growth period, then fewer grandsons died early. This caloric restriction has been known for some time to lead to longer life expectancy[26,27,28], but now we know that programming genes in response to environment and lifestyle passes down generations. Although we don't have much choice over what our grandparents did when they were children, we should be aware that the choices we make now affect ourselves for better or for worse and also impact generations yet to come. Our excesses become a kind of genetic trap for future generations.

Ageing and death are not optional but how fast we age, how long we live, and how well we live are. For example, people who regularly exercise prior to and after retirement are nearly eight times less likely to get a chronic disease before their mid-seventies compared to those who are sedentary.[29] Those with five or more lifestyle risk factors (sedentary, diabetes, poor diet...) are nearly eight times more likely to get dementia than those without those modifiable risk factors.[30]

The genetic determinants of ageing, risk of chronic illness and life expectancy are complex, but telomeres seem to play an important role. Telomeres are at their longest and healthiest at birth but throughout life they progressively shorten and fray. The shorter the telomere length (TL) the older we are biologically and the greater the risk of chronic illnesses associated with ageing like cancer, heart disease and dementia. Even before we are born significant maternal stress during pregnancy can shorten the TL of the offspring.[31] High emotional and physiological reactivity to stress is associated with short TL even in 5 year olds.[32] Thus, helping children to self-regulate their emotional response to stress early in life may be a very important investment in their long-term health. For adults it has been shown that more physiological stress and poor coping means accelerated ageing of at least a decade by late 30s.[33,34] Short TL is an important reason why people with chronic depression have an increased risk of age-related illness.[35] Pessimism is associated with a decade of accelerated ageing by middle age, along with an increased risk for chronic disease, early mortality, and greater inflammation as measured by Interleukin-6 levels.[36] Men with a disposition to high hostility age faster than men with lower hostility.[37] Poor sleep[38] internalising racial discrimination[39] and prolonged workplace stress all lead to shorter TL.[40] Women who work full time for a longer period of their life have shorter TL.[41] People without a spiritual or religious dimension to their life also age faster.[42] Being sedentary is not good from a telomere perspective[43] whereas physical exercise protects TL from the negative impact of emotional stress.[44] Shorter TL is also associated with smoking, eating processed meat, inflammation and having a high BMI.[45] Some nutritional factors associated with longer TL are the Mediterranean diet, a healthy level of vitamin D, folate, omega-3 fatty acids, fibre, vitamin C and vitamin E.[46,47,48,49,50,51] Exposure to various chemicals and pollutants at home and work are associated with shorter TL including traffic-related air pollution, pesticides, lead, exposure in car mechanical workshops, and hazardous waste exposure.[52]

Mindfulness training reduces stress but has also been shown to slow and even stop telomere shortening.[53] When you combine mindfulness with a comprehensive healthy lifestyle program, as was done in one study by Dean Ornish on men with early prostate cancer who chose watchful waiting, then telomeres regrew over a five year period, which is effectively a reversal of the ageing process.[54] These men also reversed the progression of their prostate cancer makers[55], down-regulated prostate cancer genes[56], and switched on telomerase activity.[57] As expected, the lifestyle group struggled initially to make healthy lifestyle changes but once they were established their self-mastery increased and along with it quality of life improved significantly.

This study illustrates that if we want to be happy and free of disease then we need self-mastery and to follow the laws of nature. We are not free to choose whether the laws of health exist, only to choose to follow them or not. To choose well requires awareness and wisdom or insight. To choose poorly is largely based on unconscious habit or conditioning. Habits are largely determined by our biology interacting with the environment. They can serve us well and save us having to evaluate every decision, but only if they are healthy. If they are unhealthy then they will not serve us well and they need examination.

ADDICTION

Addiction has always been a part of human life but trends suggest we are becoming a more addictive society than in times past. Alcohol has been around for millennia. Some parts of the world used opium for centuries but now there is a profusion of addictive substances many of which are far more quickly and strongly addictive than what was available previously.[58] Furthermore, the mode of administering illicit drugs by injecting them has produced many other problems not least of which is the proliferation of infectious diseases like hepatitis B and C and HIV/AIDS.

When the modern drug problem gathered momentum in the 1960s and 70s it was associated with freedom.[59] Drugs were seen as a form of protest and non-conformity. For others using drugs seemed to be a convenient solution to be free of personal and social problems. Now drug use is almost normalised and seen as a modern right of passage for young people. Modern technology has made access far easier than ever before.

Although stress and mental illness lead many people to self-medicate with a variety of substances, the reality is that this tends to perpetuate the problem. For example, stimulants like ecstasy lead to a large release of serotonin and a rapid but short-lived elevation in mood. Although this appears to produce happiness and freedom, the unfortunate reality is that it then leaves brain cells depleted of serotonin producing a trough in mood for a much longer time than the high.[60] Over time the neurons that produce serotonin become damaged and so this trough deepens and prolongs itself. There are many types of addiction other than illicit drugs that are also increasingly common including addictions to gambling, food, pornography and social media to name a few. They all have a common neurological basis.

At its zenith approximately half of men and a third of women smoked[61], but because of the massive cost of smoking-related illnesses we have since implemented and enforced strict anti-smoking laws. Thankfully rates of smoking have declined significantly in recent decades. Smoking was a widely promoted addiction shrouded in a smoke screen of misinformation and legal wrangles by the tobacco industry. The war on smoking as a public health issue has largely turned. The rate of daily alcohol use among the young has also declined in most developed countries[62] although binge drinking remains a significant problem.[63] Previously the male/female ratio of alcohol-use disorders was 5:1 and then it dropped to approximately

3:1[64]. A strange and perhaps unfortunate modern phenomenon is women increasingly adopting the once predominantly male vices as demonstrated by an extensive review of the literature suggesting that women born in the late 1900's are virtually on parity with males as far as alcohol abuse and related harms are concerned.[65]

Paradoxically, in order to help free people of the addiction to smoking and alcohol addiction there was a need to impose strict laws limiting the use and advertising of such products. This has been brought about through extensive education programs, legislation, limiting advertising, heavy taxation and other restrictive laws. Although such interventions could be construed as limiting freedom, they paradoxically promote it by helping individuals to be free of addiction. Only time will tell whether the drive to decriminalise stronger illicit drugs, such as has happened in Portugal, is a valid solution to that problem or just another step down a very slippery slope.

Gambling addiction also causes a huge amount of financial and social harm.[66] Numbers vary from country to country but in the USA up to 3% of the population are at-risk of becoming, or are, problem gamblers.[67] There are far higher rates in places with saturation exposure such as Nevada.[68] A problem gambler significantly and negatively impacts the lives of between five and 10 significant others. Problem gamblers are six times more likely to be divorced and four times more likely to have problems with alcohol and daily smoking than non-problem gamblers.[69, p.28] Children of problem gamblers are up to 10 times more likely to become problem gamblers themselves than children with non-gambling parents.[70] As opposed to smoking, attempts to rein in gambling and easy access to things like poker machines, sports betting, online gambling and gambling advertising have met with enormous resistance. 'Freedom' is the convenient and attractive refrain from industries that profit from 'legal addictions.' But does promoting gambling have anything to do with promoting freedom? Which part of the self rules a problem gambler and which part of the self rules a society that leaves people vulnerable to gambling addiction? Governments and clubs are equally addicted to non-taxation derived revenue streams from gambling and political parties are seduced by funds from gambling industry lobbyists making it extremely difficult to galvanise the community and political will necessary to act decisively. No doubt the gambling industry increasingly uses advertising and the Internet to groom a new generation of potential gamblers in a way never seen before. Perhaps one day the gambling industry and its tactics will be viewed in a similar way to how we view the tobacco industry now.

Addiction is the antithesis of freedom. It is a complex problem with many causes and contributing factors. Addictive substances promise enjoyment but deliver something entirely different. A major problem associated with mental illness and the hedonic view of happiness is the co-morbidity of drug and alcohol addiction. The brain's mesolimbic reward system is very important for our ability to experience pleasure but has implications for addiction. When it is over-stimulated then it keeps asking for a greater level of stimulation to get the same pleasurable effect. Next comes a level of tolerance and then a neurological entrapment that is very hard to reverse.

For a person with a genetic predisposition to addiction, exposure to environmental insults produces changes in gene expression and behaviour[71], an effect that can also be passed on to future generations.[72] Significant stress, especially early in upbringing, affects the brain's dopamine pathways for life with implications for a future of impaired executive functioning, impulsivity, reactivity and risk of addiction.[73]

Once the genetic levers and switches for addiction within the brain are thrown they can be very difficult, but not impossible, to switch off again. Increased dopamine release during 'relaxation response' is associated with the experience of reduced reactivity and impulsivity implying that things like the regular mental discipline of meditation practice can assist in reversing the negative impact of psychological stress to help overcome addiction.[74] This has been confirmed in various studies on substance abuse[75,76] and gambling.[77] Choosing an environment and company where a person is not exposed or encouraged to use the addictive substance is also important, as are community policies that help people not to be exposed to addictive substances in the first place.

CONCLUSION

Lifestyle-related illnesses and addictions are just two of the major problems society, healthcare systems and health practitioners are grappling with. In this article the case has been put forward that unbridled freedom and excess comes at a heavy cost when it is not consistent with natural principles and the dictates of reasonable self-mastery. It is the responsibility of practitioners, society and the healthcare system alike to foster self-mastery and create a healthy environment. Paradoxically, freedom from these problems requires self-discipline and knowing where the limits are. A reductionist and interventionist biomedical approach to healthcare uninformed by wisdom is both costly and oftentimes harmful. The more enlightened approach requires practitioner and system alike to adopt the principles and practices of whole person healthcare.■

REFERENCES

1. How to catch a monkey [video on the Internet]. 2013 [cited 2016 Dec 14]. Available from: https://www.youtube.com/watch?v=UTX7Cxq8aGc.
2. Encyclopaedia Britannica. Great Books of the Western World. The University of Chicago; 1952. p. 443.
3. Understanding the teen brain. Health Encyclopedia [Internet]. University of Rochester Medical Center, NY. [cited 2016 Dec 14]. Available from: https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=3051.
4. Lim S, Han CE, Uhlhaas PJ, Kaiser M. Preferential detachment during human brain development: age- and sex-specific structural connectivity in diffusion tensor imaging (DTI) data. Cereb Cortex 2015 Jun 15;25(6):1477-89.

5. Whittle S, Allen NB, Lubman DI, Yücel M. The neurobiological basis of temperament: towards a better understanding of psychopathology. Neurosci Biobehav Rev. 2006;30(4):511-25.
6. Whittle S, Yap MB, Yücel M, et al. Prefrontal and amygdala volumes are related to adolescents' affective behaviors during parent-adolescent interactions. Proc Natl Acad Sci U S A. 2008 Mar 4;105(9):3652-7. doi: 10.1073/pnas.0709815105.
7. Whittle S, Yücel M, Fornito A, et al. Neuroanatomical correlates of temperament in early adolescents. J Am Acad Child Adolesc Psychiatry. 2008 Jun;47(6):682-93. doi: 10.1097/CHI.0b013e31816bffca.
8. Visser TA, Ohan JL, Whittle S, et al. Sex differences in structural brain asymmetry predict overt aggression in early adolescents. 2014 Apr;9(4):553-60. doi: 10.1093/scan/nst013.
9. Mrazek MD, Mooneyham BW, Mrazek KL and Schooler JW. Pushing the Limits: Cognitive, Affective, and Neural Plasticity Revealed by an Intensive Multifaceted Intervention. Front. Hum. Neurosci. 2016;10:117. doi: 10.3389/fnhum.2016.00117
10. Makary MA, Daniel M. Medical error—the third leading cause of death in the US. BMJ 2016;353:i2139 doi: http://dx.doi.org/10.1136/bmj.i2139.
11. Mischel W, Ebbesen EB, Raskoff Zeiss A. Cognitive and attentional mechanisms in delay of gratification. Journal of Personality and Social Psychology 1972;21(2):204–218.
12. Mischel W, Shoda Y, Rodriguzez ML. Delay of gratification in children. Science 1989;244:933–938. doi:10.1126/science.2658056.
13. Ayduk ON, Mendoa-Denton R, Mischel W, Downey G, Peake PK, Rodriguez ML. Regulating the interpersonal self: Strategic self-regulation for coping with rejection sensitivity. Journal of Personality and Social Psychology 2000;79(5):776–792. doi:10.1037/0022-3514.79.5.776.
14. Schlam TR, Wilson NL, Shoda Y, Mischel W, Ayduk O. Preschoolers' delay of gratification predicts their body mass 30 years later. The Journal of Pediatrics 2013;162:90–93.
15. Shoda Y, Mischel W, Peake PK. Predicting Adolescent Cognitive and Self-Regulatory Competencies from Preschool Delay of Gratification: Identifying Diagnostic Conditions. Developmental Psychology 1990;26(6):978–986. doi:10.1037/0012-1649.26.6.978.
16. McClelland MM, Acock AC, Piccinin A, Rhea SA, Stallings MC. Relations between Preschool Attention Span-Persistence and Age 25 Educational Outcomes. Early Child Res Q. 2013 Apr 1; 28(2): 314–324. Published online 2012 Aug 3. doi: 10.1016/j.ecresq.2012.07.008.
17. Ford ES, Bergmann MM, Kröger J, et al. Healthy Living Is the Best Revenge Findings From the European Prospective Investigation Into Cancer and Nutrition–Potsdam Study. Arch Intern Med. 2009;169(15):1355-1362.
18. Elwood P, Galante J, Pickering J, Palmer S, Bayer A, et al. (2013) Healthy Lifestyles Reduce the Incidence of Chronic Diseases and Dementia: Evidence from the Caerphilly Cohort Study. PLoS ONE 8(12): e81877. doi:10.1371/journal.pone.0081877.

19. NCD Risk Factor Collaboration (NCD-RisC). Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19·2 million participants. The Lancet 2016;387(10026):1377–1396.
20. Carlier N, Marshe VS, Cmorejova J, Davis C, Müller DJ. Genetic Similarities between Compulsive Overeating and Addiction Phenotypes: A Case for "Food Addiction"? Curr Psychiatry Rep. 2015 Dec;17(12):96. doi: 10.1007/s11920-015-0634-5.
21. Weinschenk S. Why we're all addicted to texts, twitter and google. Dopamine makes you addicted to seeking information in an endless loop. Psychology Today [Internet]. 2012 [cited 2016 Dec 14]. Available from: https://www.psychologytoday.com/blog/brain-wise/201209/why-were-all-addicted-texts-twitter-and-google.
22. A Turning Point and VicHealth investigation into the concentration of liquor outlets has revealed residents in the poorest areas of Victoria have up to six times more bottle shops in their neighbourhoods than those who are well-off [Internet] VicHealth, Carlton, Victoria, Australia; 2011 [updated 2014 Nov 12]; cited 2016 Dec 14]. Available from: https://www.vichealth.vic.gov.au/media-and-resources/media-releases/study-shows-bottle-shops-concentrated-in-poor-areas -of-victoria.
23. The Victorian Health Promotion Foundation. Background Paper to VicHealth Position Statement on Health Inequalities [Internet]. 2015 [cited 2017 Jan 3]. Available from: https://www.vichealth.vic. gov.au/~/media/.../hi_background_paper_latest.ashx.
24. Hassed C. Playing the Genetic Hand Life Dealt You. Melbourne: Michelle Anderson Publishing; 2014.
25. Bygren LO, Kaati G, Edvinsson S. Longevity determined by paternal ancestors' nutrition during their slow growth period. Acta Biotheor. 2001 Mar;49(1):53-9.
26. Richardson A, Austad SN, Ikeno Y, Unnikrishnan A, McCarter RJ. Significant life extension by ten percent dietary restriction. Ann N Y Acad Sci. 2016 Jan;1363:11-7. doi: 10.1111/nyas.12982.
27. Mathers JC. Impact of nutrition on the ageing process. Br J Nutr. 2015 Jan;113 Suppl:S18-22. doi: 10.1017/S0007114514003237.
28. Soare A, Weiss EP, Pozzilli P. Benefits of caloric restriction for cardiometabolic health, including type 2 diabetes mellitus risk. Diabetes Metab Res Rev. 2014 Mar;30 Suppl 1:41-7. doi: 10.1002/dmrr.2517.
29. Hamer M, Lavoie KL, Bacon SL. Taking up physical activity in later life and healthy ageing: the English longitudinal study of ageing. Br J Sports Med doi:10.1136/bjsports-2013-092993
30. Chen ST, Siddarth P, Ercoli LM, et al. Modifiable Risk Factors for Alzheimer Disease and Subjective Memory Impairment across Age Groups. PLoS One. 2014 Jun 4;9(6):e98630. doi: 10.1371/journal.pone.0098630. eCollection 2014.
31. Entringer S, Epel ES, Kumsta R, et al. Stress exposure in intrauterine life is associated with shorter telomere length in young adulthood. Proc Natl Acad Sci U S A. 2011;108(33):E513-8.
32. Kroenke CH, Epel E, Adler N, et al. Autonomic and adrenocortical reactivity and buccal cell telomere length in kindergarten children. Psychosom Med. 2011 Sep;73(7):533-40.

33. Tomiyama AJ, O'Donovan A, Lin J, et al. Does cellular aging relate to patterns of allostasis? An examination of basal and stress reactive HPA axis activity and telomere length. Physiol Behav. 2012 Apr 12;106(1):40-5. doi: 10.1016/j.physbeh.2011.11.016.
34. Epel ES, Blackburn EH, Lin J, et al. Accelerated telomere shortening in response to life stress. Proc Natl Acad Sci U S A. 2004;101(49):17312-5.
35. Verhoeven JE, Révész D, Epel ES, et al. Major depressive disorder and accelerated cellular aging: results from a large psychiatric cohort study. Mol Psychiatry. 2013 Nov 12. doi: 10.1038/mp.2013.151.
36. Lin J,Dhabhar FS, Wolkowitz O, et al. Pessimism correlates with leukocyte telomere shortness and elevated interleukin-6 in post-menopausal women. Brain Behav Immun. 2009 May;23(4):446-9.
37. Brydon L, Lin J, Butcher L, et al. Hostility and cellular aging in men from the Whitehall II cohort. Biol Psychiatry. 2012 May 1;71(9):767-73. doi: 10.1016/j.biopsych.2011.08.020.
38. Prather AA, Puterman E, Lin J, et al. Shorter leukocyte telomere length in midlife women with poor sleep quality. J Aging Res. 2011;2011:721390. doi: 10.4061/2011/721390.
39. Chae DH, Nuru-Jeter AM, Adler NE, et al. Discrimination, racial bias, and telomere length in African-American men. Am J Prev Med. 2014 Feb;46(2):103-11. doi: 10.1016/j.amepre.2013.10.020.
40. Ahola K, Sirén I, Kivimäki M, et al. Work-related exhaustion and telomere length: a population-based study. PLoS One. 2012;7(7):e40186. doi: 10.1371/journal.pone.0040186.
41. Parks CG, DeRoo LA, Miller DB, et al. Employment and work schedule are related to telomere length in women. Occup Environ Med. 2011 Aug;68(8):582-9. doi: 10.1136/oem.2010.063214.
42. Hill TD, Ellison CG, Burdette AM, Taylor J, Friedman KL. Dimensions of religious involvement and leukocyte telomere length. Soc Sci Med. 2016 Apr 28. pii: S0277-9536(16)30206-4. doi: 10.1016/j.socscimed.2016.04.032.
43. Krauss J, Farzaneh-Far R, Puterman E, et al. Physical fitness and telomere length in patients with coronary heart disease: findings from the Heart and Soul Study. PLoS One. 2011;6(11):e26983. doi: 10.1371/journal.pone.0026983.
44. Puterman E, Lin J, Blackburn E, et al. The power of exercise: buffering the effect of chronic stress on telomere length. PLoS One. 2010 May 26;5(5):e10837.
45. Lin J, Epel E, Blackburn E. Telomeres and lifestyle factors: roles in cellular aging. Mutat Res. 2012 Feb 1;730(1-2):85-9. doi: 10.1016/j.mrfmmm.2011.08.003.
46. Valdes AM, Andrew T, Gardner JP, et al. Obesity, cigarette smoking, and telomere length in women. Lancet. 2005;366:662-4.
47. Crous-Bou M, Fung TT, Prescott J, Julin B, Du M, Sun Q, Rexrode KM, Hu FB, De Vivo I. Mediterranean diet and telomere length in Nurses' Health Study: population based cohort study. BMJ. 2014;349: g6674. Published online 2014 December 2. doi: 10.1136/bmj.g6674.

48. Boccardi V, Esposito A, Rizzo MR, Marfella R, Barbieri M, Paolisso G. Mediterranean diet, telomere maintenance and health status among elderly. PLoS One. 2013; 8(4): e62781. Published online 2013 April 30. doi: 10.1371/journal.pone.0062781
49. Farzaneh-Far R, Lin J, Epel ES, Harris WS, Blackburn EH, Whooley MA. Association of marine omega-3 fatty acid levels with telomeric aging in patients with coronary heart disease. JAMA. 2010 Jan 20;303(3):250-7.
50. Kiecolt-Glaser JK, Epel ES, et al. Omega-3 fatty acids, oxidative stress, and leukocyte telomere length: A randomized controlled trial. Brain Behav Immun. 2013 Feb;28:16-24. doi: 10.1016/j.bbi.2012.09.004.
51. O'Callaghan NJ, Toden S, Bird AR, et al. Colonocyte telomere shortening is greater with dietary red meat than white meat and is attenuated by resistant starch. Clin Nutr. 2012 Feb;31(1):60-4. doi: 10.1016/j.clnu.2011.09.003.
52. Zhang X, Lin S, Funk WE, Hou L. Republished: Environmental and occupational exposure to chemicals and telomere length in human studies. Postgrad Med J. 2013 Dec;89(1058):722-8. doi: 10.1136/postgradmedj-2012-101350rep.
53. Carlson LE, Beattie TL, Giese-Davis J, Faris P, Tamagawa R, Fick LJ, Degelman ES, Speca M. Mindfulness-based cancer recovery and supportive-expressive therapy maintain telomere length relative to controls in distressed breast cancer survivors. Cancer. 2014 Nov 3. doi: 10.1002/cncr.29063.
54. Ornish D, Lin J, Chan JM, et al. Effect of comprehensive lifestyle changes on telomerase activity and telomere length in men with biopsy-proven low-risk prostate cancer: 5-year follow-up of a descriptive pilot study. Lancet Oncol. 2013 Sep 16. doi:pii: S1470-2045(13)70366-8. 10.1016/S1470-2045(13)70366-8.
55. Frattaroli J, Weidner G, Dnistrian AM, et al. Clinical events in prostate cancer lifestyle trial: results from two years of follow-up. Urology. 2008 Dec;72(6):1319-23. doi: 10.1016/j.urology.2008.04.050.
56. Ornish D, Magbanua MJ, Weidner G, et al. Changes in prostate gene expression in men undergoing an intensive nutrition and lifestyle intervention. Proc Natl Acad Sci U S A. 2008 Jun 17;105(24):8369-74. doi: 10.1073/pnas.0803080105.
57. Ornish D, Lin J, Daubenmier J, et al. Increased telomerase activity and comprehensive lifestyle changes: a pilot study. Lancet Oncol. 2008 Nov;9(11):1048-57. doi: 10.1016/S1470-2045(08)70234-1.
58. Emerging Trends and Alerts [Internet]. National Institute of Drug Abuse, Bethesda, Maryland, USA. 2016 [cited 2016 Dec 20]. Available from: http://www.drugabuse.gov/drugs-abuse/emerging-trends.
59. Turn on, tune in, drop out [Internet]. Wikipedia. 2016 Sep 2 [cited 2016 Dec 20]. Available from: https://en.wikipedia.org/wiki/Turn_on,_tune_in,_drop_out.
60. What does MDMA do to the brain? [Internet]. National Institute of Drug Abuse, Bethesda, Maryland, USA. 2006 [cited 2016 Dec 20]. Available from: http://www.drugabuse.gov/publications/mdma-ecstasy-abuse/what-does-mdma-do-to-brain.

61. Health Risk Factors: Trends in smoking [Internet]. Australian Bureau of Statistics. 2006 [cited 2016 Dec 20]. Available from: http://www.abs.gov.au/ausstats/abs@nsf/2f762f95845417aeca25706c00834efa/738d23457b86defbca2570ec000e2f5c!OpenDocument.
62. Looze Md, Raaijmakers Q, Bogt TT, et al. Decreases in adolescent weekly alcohol use in Europe and North America: evidence from 28 countries from 2002 to 2010. Eur J Public Health. 2015 Apr;25 Suppl 2:69-72. doi: 10.1093/eurpub/ckv031.
63. Richter L, Pugh BS, Peters EA, Vaughan RD, Foster SE. Underage drinking: prevalence and correlates of risky drinking measures among youth aged 12-20. Am J Drug Alcohol Abuse. 2015 Dec 18:1-10.
64. Hasin DS, Stinson FS, Ogburn E, et al. Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. Arch Gen Psychiatry. 2007;64(7):830–42.
65. Slade T, Chapman C, Swift W, et al. Birth cohort trends in the global epidemiology of alcohol use and alcohol-related harms in men and women: systematic review and metaregression. BMJ Open 2016;6:e011827. doi:10.1136/bmjopen-2016-011827.
66. Gambling [Internet]. Australian Government. Department of Social Services. 2016 [cited 2016 Dec 20]. Available from: http://www.problemgambling.gov.au/facts/.
67. Problem gaming [Internet]. European Gaming and Betting Association. [cited 2016 Dec 20]. Available from: http://www.egba.eu/ pdf/EGBA_FS_ProblemGaming.pdf.
68. Volberg RA. Gaming and problem gaming in Nevada [Internet]. Report to the Nevada Department of Human Resources. 2002 March 22 [cited 2016 Dec 20]. Available from: http://www.nevadacouncil.org/wp-content/uploads/2014/08/NV-Prevalence-Study-Adults-2002.pdf.
69. Thomas S, Jackson A. Risk and protective factors, depression and co-morbidities in problem gambling [Internet]. BeyondBlue. 2008 [cited 2016 Dec 20]. Available from: https://www.beyondblue.org.au/about-us/researchprojects/research-projects/risk-and-protective-factors-depression-and-co-morbidities-in-problemgambling.
70. The problem gambling research and treatment centre. Final report [Internet]. Victorian Government, the University of Melbourne and Monash University. 2010 [cited 2016 Dec 20]. Available from: https://www.liquorandgaming.justicensw.gov.au/Documents/gaming-and-wagering/problems-with-gambling/research/research-children-at-risk-of-developing-problem-gambling.pdf.
71. Peña CJ, Bagot RC, Labonté B, Nestler EJ. Epigenetic Signaling in Psychiatric Disorders. J Mol Biol. 2014 Apr 5. pii: S0022-2836(14)00174-0. doi: 10.1016/j.jmb.2014.03.016.
72. Vassoler FM, Sadri-Vakili G. Mechanisms of transgenerational inheritance of addictive-like behaviors. Neuroscience. 2013 Aug 3. pii: S0306-4522(13)00658-1. doi: 10.1016/j.neuroscience.2013.07.064.
73. Brake WG, Zhang TY, Diorio J, et al. Influence of early postnatal rearing conditions on mesocorticolimbic dopamine and behavioural responses to psychostimulants and stressors in adult rats. Eur J Neurosci. 2004 Apr; 19(7):1863-74.

74. Kjaer TW, Bertelsen C, Piccini P, et al. Increased dopamine tone during meditation-induced change of consciousness. Brain Res Cogn Brain Res. 2002 Apr;13(2):255-9.
75. Bowen S, Chawla N, Collins SE, et al. Mindfulness-based relapse prevention for substance use disorders: a pilot efficacy trial. Subst Abus. 2009 Oct-Dec; 30(4):295-305.
76. Bowen S, Witkiewitz K, Clifasefi SL, et al. Relative efficacy of mindfulness-based relapse prevention, standard relapse prevention, and treatment as usual for substance use disorders: a randomized clinical trial. JAMA Psychiatry. 2014 May;71(5):547-56.
77. Maynard BR, Wilson AN, Labuzienski E, Whiting SW. Mindfulness-based approaches in the treatment of disordered gambling: a systematic review and meta-analysis. Research on social work practice. Published online October 16, 2015. doi: 10.1177/1049731515606977.