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# The Impact of Addictive Substances and Behaviours on Individual and Societal Well-being

Edited by Peter Anderson, Jürgen Rehm, and Robin Room



GOVERNANCE OF ADDICTIVE SUBSTANCES AND BEHAVIOURS SERIES

# **The Impact of Addictive Substances and Behaviours on Individual and Societal Well-being**

## **Governance of Addictive Substances and Behaviours Series**

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# Foreword

This book, *The Impact of Addictive Substances and Behaviours on Individual and Societal Well-being*, is the second in a planned series of six books arising out of ALICE RAP (Addictions and Lifestyles in Contemporary Europe—Reframing Addiction's Project), a 5-year, €10 million endeavour co-financed by the Social Sciences and Humanities division of FP7 within the European Commission and led by the Foundation for Biomedical Research based in Barcelona and the Institute of Health and Society at Newcastle University (<<http://www.alicerap.eu/>>). The first book described current European approaches to governing addictive substances and behaviours (Ysa et al., 2014). Subsequent books will address the determinants of harm from addictive substances and behaviours, how concepts of addictive substances and behaviours have changed across time and place, the impact of market forces on addictive substances and behaviours, and how we can work towards a new governance of addictive substances and behaviours.

ALICE RAP studies the place of addictions and lifestyles in present-day Europe and aims to inform how we can better redesign their governance. By addictions, we mean the regular and sustained heavy use of drugs, such as alcohol, nicotine, and cocaine and regular and sustained heavy engagement in actions such as gambling or internet gaming.

Three things in particular strike one on reading this book. First, the extent of the harm done by addictive substances is phenomenal. In 2010, for the world as a whole, out of sixty-seven risk factors for a combined measure of ill-health and premature death (measured as disability-adjusted life years, DALYs), tobacco use was the second most important risk factor, alcohol the fifth, and illicit drug use the eighteenth (high blood pressure was the first, household air pollution from solid fuels the third, and a diet low in fruits the fourth; Lim et al., 2012). Secondly, harm is not just about health but about all aspects of life. Addictive substances can impair quality of life through their impact on work, education, civic engagement, social connections, and personal security; they can impair material living conditions through their impact on income and wealth, jobs and earnings, and housing; and, they can impair the sustainability of well-being over time by diminishing economic, human, and social capital. Thirdly, harm does not result just from the addictive drug itself, but also the societal response

to the drug, which can cause more harm than the drug itself through stigma, social exclusion, and actions of the criminal justice system.

What is also clear from this book is that money features highly when considering addictive substances. Too much money through the greed of those who produce and market addictive substances is a driver of harm. Too little money amongst those who use drugs is a driver of harm—for the same level of drug use, poorer people are more likely to die from drug-related causes than richer people. And, too much money is wasted—the untaxed retail value of cannabis alone in the European Union is between €18 and €30 billion per year, with profits accruing to organized criminal networks and unregulated markets.

This book shows that as far as human experience with drugs is concerned, there is nothing new. Psychoactive drug use is a pan-human phenomenon, widespread in the archaeological record, at least for the last 12,000 years. Beyond this, during the evolution of the human lineage there were biological fitness benefits associated with regulated consumption of psychoactive drugs, which are primarily plant toxins. Humans were thus active agents in drug-seeking behaviour, and its neurophysiological basis could have evolved because of beneficial effects of neurotoxins. But, in present-day society, with the globalization of markets, heavy use is common, and going beyond a certain boundary leads to stigmatization, particularly for poorer and marginalized groups of society. We can understand the concept of addiction as a particular way of explaining why so much harm can result from something so attractive. The problem, though, is that the addiction concept tends to dichotomize harm, when this is not the case—harm being on a continuum—and it narrows societal attention to the individual level of those engaged in the behaviour, neglecting the fact that the environment in which someone lives is a major determinant of drug use and harm.

Hippocrates (1978), writing 2,500 years ago, advised anyone coming to a new city to enquire whether it was likely to be a healthy or unhealthy place to live, depending on its geography and the behaviour of its inhabitants ('whether they are fond of excessive drinking'). He continued 'as a general rule, the constitutions and the habits of a people follow the nature of the land where they live.' When redesigning the governance of addictions, we need to take this into account. The bad news is that, as the first book in this series pointed out, there is no group of countries in Europe whose policies on addictive substances could be described as optimal in promoting quality of life, material living conditions, and sustainability of well-being over time (Ysa et al., 2014). The good news is that we can all do better.

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### **References**

- Hippocrates** (1978). *Hippocratic Writings*. Edited with an introduction by G.E.R. Lloyd. Harmondsworth: Penguin.
- Lim, S.S., Vos, T., Flaxman, A.D., et al.** (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, **380**, 2224–2260.
- Ysa, T., Colom, J. Albareda, A., Ramon, A., Carrión, M., & Segura, L.** (2014). *Governance of Addictions: European Public Policies*. Oxford: Oxford University Press.



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# **Introduction to addictive behaviours**

Peter Anderson, Jürgen Rehm, and Robin Room

## **1.1 Addictive behaviours as a conceptual frame**

This book focuses on a set of behaviours which are commonly described as ‘addictive’. As will be discussed, the behaviours that are considered ‘addictive’ have varied by time and place, although they have always included the use of at least some psychoactive substances. The common characteristics identified by the descriptor ‘addictive’ are: that the behaviour has attractive effects for the person engaged in it; that the effects are attractive enough that some who try it go on to repeated and heavy patterns of the behaviour; and that the behaviour often has negative health and social consequences for the person engaged in it, and often also for others.

To focus on the addictive dimension of behaviours is to emphasize thinking and action at the level of the interaction between the substance or behaviour and the individual consumer. The concept of addiction was first popularized as an explanation in terms of an individual’s loss of self-control over his or her own behaviour (alcohol consumption), despite negative consequences or an apparent desire to desist (Levine, 1978). For the individual, the attraction and reinforcement of the behaviour become so great that often neither disincentives nor willpower can curb it.

In this book we expand the perspective on the dynamics of addictive behaviours beyond the individual consumer, and beyond substances. Firstly, addictive behaviours often cause harm to or carry costs for others, which may not be taken into account in an individual’s decisions about the behaviour. The heavy gambler is often using up collectively owned resources—the family’s joint finances and assets—in pursuit of his or her personal pleasure in or devotion to gambling (Borch, 2012). A heavy drinker’s behaviour often causes harms to family members, friends, and strangers (Laslett et al., 2011). And second-hand smoke threatens the health of people who happen to be close enough to

smokers (US Department of Health and Human Services, 2006). Besides harms to specific others, the behaviour may also result in harm at a collective level, for instance in loss of productivity for the consumer's workplace or the disturbance of peace and order for a community (see Chapter 9). The term 'externalities' used in economics conveys the reality that behavioural choices about consumption are often made considering only the interest of the consumer without taking into account the interests of others.

Secondly, most of the behaviours considered as addictive are potentially commodifiable and subject to market forces. Because of their attractions for use, and particularly for repeated and heavy use, commercialized addictive products or behaviours are potentially especially profitable. History is replete with examples of extreme levels of addictive behaviours, with large societal harms and costs, when commercial interests have had free rein to promote and sell addictive products and behaviours in a laissez-faire system of market governance.

Thirdly, history also records many instances of substantial societal reaction to addictive behaviours as a consequence of these harms and costs. The radical response, to prohibit commercial sale and promotion altogether, has been quite widespread. Most commercialized gambling was outlawed in many countries in the later nineteenth century and the first half of the twentieth (e.g. Dixon, 1991; Campbell and Smith, 2003). All alcohol sales were prohibited at some time in the period between 1910 and 1935 in at least 13 self-governing states, including four in Europe (Schrad, 2010). The non-medical sale and use of over 250 psychoactive substances is currently globally prohibited under international drug control treaties (Room and Reuter, 2012). Between the extremes of laissez-faire and prohibition, governments and societies have pursued various strategies of regulation and normative control of addictive behaviours, and particularly of the commercial promotion of such behaviours. A burgeoning public health-oriented literature considers these strategies and the evidence on whether and how they are effective in limiting addictive behaviours (e.g. Babor et al., 2010a,b; Ysa et al., 2014).

An important corollary of the societal importance of addictive behaviours and their consequences is that legislative and normative responses often seek to limit the behaviour by derogating and stigmatizing consumers and their behaviour. To be called a 'drunk' in English, a '*clochard*' in French, or a '*Säufer*' in German is not a compliment. As will be discussed in later chapters, these social processes of derogation become sources of secondary harms to consumers and those associated with them, and this needs to be taken into account in policy-making.

## 1.2 Addictive behaviours in Europe in the last fifty years

The last fifty years have been characterized by important changes in people's lives and lifestyles and in European society, social structures, and values. The changing nature of work and of private life, the evolution of the patterns of consumption, values, attitudes, and beliefs of modern societies have all changed the place and challenges of addictions in current European society. Addictions are an extensive feature of modern societies, bringing considerable concerns. As their number seems to have increased over the last decades, they have become a focus of social, economic, and political attention, sometimes polarizing societies and politics. In addition to the widely acknowledged problem of addiction to various substances, there is a growing problem of new addictions such as gambling, eating disorders, and use of the internet. A considerable proportion of all expenditure in European health systems flows into the treatment of various addictions, and even more into the treatment of their mental and physical health consequences. In addition, there are the costs of prevention and the associated crime, which increasingly have global dimensions. Thus the governance (the way in which a society or organization steers itself with respect to addictions) and stewardship of addictions need to balance individual freedom and social responsibility while taking into account social, economic, and ethical considerations.

## 1.3 Framing the book

This book addresses the impact of addictive substances and behaviours on individual and societal well-being. The book arises out of the ALICE RAP project, a 5-year scientific endeavour to analyse and take stock of the challenges of addictions and lifestyles to the cohesion, organization, and functioning of present-day European society (<<http://www.alicerap.eu/>>). This book is the second in a series of six on the governance of addictive substances and behaviours. The first book described current European approaches to the governance of addictive substances and behaviours (Ysa et al., 2014). Subsequent books will address the determinants of harm from addictive substances and behaviours, how concepts of addictive substances and behaviours have changed across time and place, the impact of market forces on addictive substances and behaviours, and progress towards a new governance of addictive substances and behaviours. The frame of the ALICE RAP project, and thus of this book, is public health and well-being, and included within this is a consideration of harm, whether at individual, interpersonal, or social and societal levels. Charting the adverse consequences of



addictive behaviours, considered both in terms of direct harms and of their negative impact on well-being, is a major focus of this book.

What we mean by addictive substances and behaviours are primarily substances such as alcohol, nicotine, and illegal drugs (e.g. cannabis, cocaine, and opiates) and behaviours such as gambling. In this book we touch on all of these, but largely focus on alcohol, nicotine, and illegal drugs. This simply reflects the much greater literature on drugs than on behaviours.

Addictive substances and behaviours interact with a wide range of dimensions and domains of individual and societal well-being (see Chapter 4). In terms of quality of life, these include health, work–life balance, education and skills, civic engagement and governance, social connections, personal security, and subjective well-being itself. In terms of material living conditions, these include jobs and earnings, and housing. Addictive substances and behaviours also interact with the sustainability of well-being over time, by impacting upon trajectories of human, social, and economic capital. The interactions across all these dimensions are two-way. Take jobs and earnings as an example. On the one hand, heavy use of drugs (alcohol, tobacco, and illicit drugs) impairs an individual's employability and performance at work; on the other hand, highly demanding unrewarding jobs increase the risk of heavy drug use. So, while this book addresses the impact of addictive substances and behaviours on individual and societal well-being, it also addresses the dimensions and domains of societal well-being as drivers of both heavy drug use and the harm done by drug use—which in turn cause more harm to individual and societal well-being. Take social exclusion as an example. As already noted, heavy drug users are often stigmatized and socially excluded (see Chapter 7). Social exclusion can exacerbate drug use, and at any given level of drug use the socially excluded suffer more harm (see Chapter 10). Drug users can also be sent to prison, which disenfranchises them and removes them from the labour market, severely diminishing their future employment and earning prospects. So, the relation between drug use and adverse consequences is not a simple process; it is compounded by society's reaction to drugs, which can sometimes cause more harm than the drugs themselves.

## 1.4 Overview of the book

In Chapter 2, Sullivan and Hagen remind us that the aetiological theory of human drug use has historically been dominated by the notion that drug use is initiated and sustained by biological and behavioural rewards and reinforcement. They note that the operationalization of drug reward theory has invoked other aetiological concepts, including the nature of novelty in human encounters with

drugs, and human behavioural and biological vulnerability to drugs. They go on to point out that if one stands back and considers drugs from anthropological, ethnohistorical, and evolutionary perspectives, the notion is actually very different. With respect to many drugs, human evolution has entailed a long and dynamic relationship that has been active and functional, rather than passive and vulnerable; and that fundamental ecological dynamics, rather than rewards, have been the primary 'cause' of human drug use.

Sullivan and Hagen note that the use of psychoactive drugs primarily involves plant toxins which, while triggering avoidance mechanisms in most individuals have been an important part of animal diets for hundreds of millions of years. Yet psychoactive drug use is a pan-human phenomenon, involving similar substances and concentrations across a diverse array of cultures, and is widespread in the archaeological record, at least for much of the Holocene era (the last 11,700 years). To explain this, Sullivan and Hagen suggest that during the evolution of the human lineage there were biological fitness benefits associated with regulated consumption of these substances. These fitness benefits could include pharmacophagy (the consumption of pharmacologically active substances), the exploitation of plant toxins against parasites, and the use of ingested compounds that chemically resemble endogenous signalling molecules at times when internal signalling functions could become compromised due to deficiencies in other dietary precursors in marginal environments. Thus, Sullivan and Hagen argue that, in principle, drug-seeking behaviour, and its neurophysiological basis, could have evolved because of the beneficial effects of neurotoxins. Although there is no doubt that such neurotoxins can constitute serious health hazards, these hazards, which often only appear at high doses or later in life, may have been offset by immediate benefits, resulting in a net increase in biological fitness.

Sullivan and Hagen do not discuss alcohol, but other evidence of the presence of ethanol within ripe fruit suggests low-level but chronic dietary exposure for all fruit-eating animals (Dudley, 2004). Volatilized alcohols from fruit could potentially serve in olfactory localization of transient nutritional resources, whereas ethanol consumed during the course of frugivory (fruit consumption) may act as an appetitive stimulant. As a consequence, natural selection may have acted on all frugivorous animals, including human ancestors, to associate ethanol consumption with nutritional reward. Studies of the evolution of the functions of ancestral alcohol dehydrogenases in primates has found that while the enzymes from the most ancient primate ancestors of humans were largely *inactive* against ethanol they could metabolize *other* alcohols, including the terpene alcohols abundant in the leaves of plants (Benner, 2013). Primate ancestors living 16–21 million years ago could not effectively metabolize consumed

ethanol. However, by 6–12 million years before the present, the last common ancestor of humans with gorillas and chimpanzees had evolved a digestion fully able to metabolize consumed ethanol at the levels found in fermenting fruits. Later effects of alcohol use on human evolution are discussed in McGovern (2009), who identifies alcohol as crucial in humans making the transition to becoming farmers.

In Chapter 3, Laura Schmidt follows the recent trend in professional psychiatry towards expansion of the addiction concept to include new substances, such as sugar, and new habitual behaviours, such as gambling, internet gaming, and pornography use, into a pan-addiction model that would provide a single explanatory framework encompassing both substance and behavioural addictions. Schmidt argues that the widening scope of addictive disorders is a response to tangible changes unfolding in the information age, as globalized markets make a greater abundance of pleasurable substances and experiences available to consumers on a 24-hour, 7-day a week basis than ever before. She notes that discussions around expanding diagnoses of addiction also reflect psychiatry's own territorial and financial interests in responding to the growing demand for ways to help individuals achieve hedonic balance in a social context that increasingly fails to support it.

In Chapter 4, Laura Stoll and Peter Anderson describe how measures of societal well-being are increasingly being used as a holistic way of measuring societal progress rather than the single measure of national economic productivity (i.e. gross domestic product, GDP). They describe the Organisation for Economic Co-operation and Development's (OECD) Framework for Measuring Wellbeing and Progress, including quality of life, material living conditions, and sustainability over time. Stoll and Anderson give three examples of the interactions of well-being with addictive substances. First, they argue that quality of life and material living conditions are potentially adversely affected by addictive substances. In their second example, classifying cannabis as an illegal substance is argued to impair quality of life, material living conditions, and sustainability of well-being over time. Thirdly, while people have a diminished quality of life and material living conditions upon entering opioid substitution treatment, this is often, but not always, improved by treatment. Finally, based on the work of Ysa et al. (2014), Stoll and Anderson point out that there is no group of countries in Europe whose policies on addictive substances could be described as optimal in promoting quality of life, material living conditions, and sustainability of well-being over time.

In Chapter 5, Kevin Shield and Jürgen Rehm summarize the findings on risk factors for disability or death from the most recent global burden of disease study. For the world as a whole, tobacco use was the second largest contributor

to the burden of disease in 2010 [measured as disability-adjusted life years (DALYs), a summary measure of ill-health and premature death], alcohol was the fifth largest contributor, and illicit and non-medical drug use was the eighteenth largest contributor. (High blood pressure was the first, household air pollution from solid fuels the third, and a diet low in fruits the fourth; Lim et al., 2012.) Reflecting variations in how much use there is, and also in the magnitude of competing risk factors, there is substantial variation in the rankings by global region, with the ranking of tobacco, alcohol, and drugs in Europe at least as high as the global average. The rankings and estimated magnitude of DALYs also vary over time. When corrected for population structure, for example, the global burden of alcohol use actually decreased from 1636 DALYs per 100,000 people in 1990 to 1444 DALYs per 100,000 people in 2010. However, although alcohol's burden of disease per 100,000 people has slightly decreased, the percentage of all DALYs attributable to alcohol use has increased from 2.9% in 1990 to 3.9% in 2010, an increase of a third. This increase basically reflects that deaths attributable to alcohol and the other health burdens it caused did not decrease to the same degree as the decrease of burden of disease in general. Other factors contributing are the change in population age structure and the fact that alcohol use is mainly increasing in low-income countries as they became wealthier and their overall health indicators improve (alcohol use is strongly correlated with the GDP of a country adjusted for purchase power parity; see Chapter 10).

The next two chapters shift attention from the harms directly attributable to addiction behaviours to the evidence on commonly used preventive approaches, considering first such strategies as education and second the indirect effects of deterrence strategies. In Chapter 6, Patricia Conrod and colleagues find that although binge-drinking and illicit drug use are common among European youth, there is little evidence to support the majority of approaches currently adopted and delivered by many European countries to address substance-related harm in young people. Although some individual prevention programmes have shown beneficial effects on addictive behaviour outcomes, Conrod and colleagues argue that it is not currently possible to generalize beyond implementation of specific interventions to recommend any broad policy approaches based upon the underpinning principles of these programmes.

In Chapter 7, Jacek Moskalewicz and Justyna Klingemann give a devastating account of the social stigma associated with addictive substances. Throughout history, stigma has been extended to cover large segments of society, the lower classes and ethnic minorities, in order to discredit their claims for more social justice and to legitimize the superior position of the dominant classes. Moskalewicz and Klingemann describe how social stigma reinforced by the criminal

justice system is used to justify the imposition of harsh control measures on individuals and social classes which are not considered as deserving social justice due to their moral inferiority manifested by their apparently excess use of psychoactive substances. Moskalewicz and Klingemann note that the disease concept of addiction has failed to remove stigma, as, in public perception, a moral condemnation of addictions is reinforced by a medical stigma of chronic disease with poor prospects for recovery. Addiction treatment has very low social status—for both its patients and its providers—and thus attracts only low investment, resulting in poor treatment outcomes, further stigmatization, and progressive marginalization.

In Chapter 8, Aleksandra Dubanowicz and Paul Lemmens describe the impacts of economic downturns, with their associated cuts in public spending, increases in unemployment, and decreases in income, on addictive substances. While finding that the use of alcohol and tobacco in general declines in times of economic crisis, mainly due to decreased affordability, patterns of use alter and become more harmful, so that, for example, deaths from alcohol use disorders may increase in times of economic crisis (Stuckler et al., 2009). Dubanowicz and Lemmens find mixed evidence for illicit drug use—in some studies economic downturns are associated with reductions in illegal drug use, while in others the opposite is true. The main mechanisms identified are effects of declining disposable income and changes in the structure of everyday life due to unemployment and loss of social roles. Dubanowicz and Lemmens find that the negative impacts of recessions are worsened by the introduction of welfare cuts by hard-pressed governments.

In Chapter 9, Kevin Shield and colleagues demonstrate that addictive substances and behaviours result in enormous social costs for Europe. Although they focus on people who fit the criteria of dependence, using data from their original sources and updating to 2010, alcohol and tobacco together are found to cost the European Union some €300 billion in terms of costs relating to health, crime, and lost productivity. Many of these costs are avoidable. However, to access such savings, societies have to do something effective to reduce the use of alcohol and tobacco.

In Chapter 10, Robin Room, and co-authors describe the interplay between various socioeconomic dimensions and addictive substances—alcohol, tobacco, and other psychoactive drugs. Room and colleagues note that poorer users tend to suffer greater health and injury consequences for a given level of substance use than richer users. Poorer users are also usually subject to greater stigmatization and marginalization than less poor users. Using the example of alcohol, Room and colleagues find that economic development fuels a growing market for alcohol, compounded by commercial forces

pushing for open and greater markets—yet problems arising from this growing market are a drag on economic development itself.

In Chapter 11, David Miller and Claire Harkins describe how corporate actions influence policy decisions and the way in which they are implemented and enforced (or not). They highlight the murky waters of corruption, and especially institutional corruption and the responses to it, including lack of transparency. Miller and Harkins argue that policy responses to enhance well-being should, in addition to comforting those afflicted by addictions, also focus on those economic and policy levers that can have very significant effects downstream in terms of both individual behaviours and the wider societal impact.

## 1.5 Bringing it all together

There are things about psychoactive substances which humans have always found positive, though the positives may be trivialized in one place and time and dramatized in another. It is also clear that the negative consequences of psychoactive substances have long been recognized, and that the impulse to control the supply of drugs goes back a long way in history.

What is also clear is that while the market and market forces have been fruitful instruments of capital accumulation (whether or not this is viewed as good or bad; Sloterdijk, 2014), if they are left to flourish undisturbed the result can easily be heavy substance use, which is frequently problematic for individuals and societies. In an era when economic and political ideology discourages government intervention in markets, governments frequently resort instead to approaches aiming to single out and punish the individual heavy substance user. Unfortunately, such societal reactions to reduce such problematic use often produce their own problems. They are also usually differentially applied to produce social injustice and inequality, compounded by the perverse negative interference of criminal justice systems.

We can understand the concept of addiction as a particular way of explaining why so much harm can result from something so attractive. The concept of addiction is rooted in personal experiences, but these experiences need to be understood in terms that reach beyond the individual to include the market, governments, and civil society, with the outcomes also driven by the demands of many different stakeholders. From a pragmatic public health perspective, the primary sources of harm are sustained heavy use, with some contribution from sporadic heavy use. Unfortunately, the addiction concept and its baggage can often just get in the way of this, by narrowing societal attention to the level of the individual engaged in the behaviour.

How can public health be preserved or increased in such circumstances? In Chapter 12 we stress favourable environments and health-promoting societal contexts (Davies et al., 2014). Such contexts are characterized by cultures in which healthy behaviours are the norm, and in which the institutional, social, and physical environment supports such norms. Achievement of this ambition will require a positive, holistic, eclectic, and collaborative effort, involving a broad range of stakeholders. To move towards achieving this goal, the value of health and incentives for healthy behaviour should be emphasized (Anderson et al., 2011), healthy choices in behaviour should become the default (Bloomberg, 2011), and factors that create a culture and environment which promote unhealthy behaviour should be minimized.

## References

- Anderson, P., Harrison, O., Cooper, C., & Jané-Llopis, E. (2011). Incentives for health. *Journal of Health Communication*, **16**(Suppl. 2), 107–133.
- Babor, T., Caetano, R., Casswell, S., et al. (2010a). *Alcohol: No Ordinary Commodity—Research and Public Policy*, 2nd edn. Oxford: Oxford University Press.
- Babor, T., Caulkins, J., Edwards, G., et al. (2010b). *Drug Policy and the Public Good*. Oxford: Oxford University Press.
- Benner, S. (2013). Paleogenetics and the history of alcohol in primates. *AAAS 2013 Annual Meeting Abstracts*. URL: <<https://aaas.confex.com/aaas/2013/webprogram/Paper8851.html>>.
- Bloomberg, M. (2011). Mayor Bloomberg's remarks at the United Nations General Assembly high level meeting on non-communicable diseases. URL: <<http://mikebloomberg.com/index.cfm?objectid=88C81DF6-C29C-7CA2-FCBB0555D5B99541>>.
- Borch, A. (2012). The Real of problem gambling households. *Journal of Gambling Issues*, issue 27. URL: <<http://jgi.camh.net/doi/pdf/10.4309/jgi.2012.27.6>>.
- Campbell, C.S. & Smith, G.J. (2003). Gambling in Canada—from vice to disease to responsibility: a negotiated history. *Canadian Bulletin of Medical History*, **20**, 121–149.
- Davies, S.C., Winpenney, E., Ball, S., Fowler, T., Rubin, J., & Nolte, E. (2014). A new wave in public health improvement. *Lancet*, doi: 10.1016/S0140-6736(13)62341-7.
- Dixon, D. (1991). *From Prohibition to Regulation: Bookmaking, Anti-Gambling and the Law*. Oxford: Clarendon Press.
- Dudley, R. (2004). Ethanol, fruit ripening, and the historical origins of human alcoholism in primate frugivory. *Integrative and Comparative Biology*, **44**, 315–323.
- Laslett, A.-M., Room, R., Ferris, J., Wilkinson, C., Livingston, M., & Mugavin, J. (2011). Surveying the range and magnitude of alcohol's harm to others in Australia. *Addiction*, **106**, 1603–1611.
- Levine, H.G. (1978). The discovery of addiction: changing conceptions of habitual drunkenness in America. *Journal of Studies on Alcohol*, **15**, 493–506.
- Lim, S.S., Vos, T., Flaxman, A.D., et al. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions,

- 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, **380**, 2224–2260.
- McGovern, P. (2009). *Uncorking the Past: The Quest for Wine, Beer, and Other Alcoholic Beverages*. Berkeley, CA: University of California Press.
- Room, R. & Reuter, P. (2012). How well do international drug conventions protect public health? *Lancet*, **379**, 84–91.
- Schrad, M.L. (2010). *The Political Power of Bad Ideas: Networks, Institutions and the Global Prohibition Wave*. Oxford: Oxford University Press.
- Sloterdijk, P. (2014). *In the World Interior of Capital*. Cambridge: Polity Press.
- Stuckler, D., Basu, S., Suhrcke, M., Coutts, A., & McKee, M. (2009). The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis. *Lancet*, **374**, 315–323.
- US Department of Health and Human Services (2006). *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.
- Ysa, T., Colom, J. Albareda, A., Ramon, A., Carrión, M., & Segura, L. (2014). *Governance of Addictions: European Public Policies*. Oxford: Oxford University Press.





# **Passive vulnerability or active agency? An ecological and evolutionary perspective on human drug use**

Roger J. Sullivan and Edward H. Hagen

## **2.1 An introduction to the ecological perspective of drug use**

Drug policy is strongly influenced by aetiological theories of human drug use. Historically, such theories have been dominated by two key concepts—human drug use is initiated and sustained by *reward* and *reinforcement* at both biological and behavioural levels. The operationalization of these ideas has invoked several other historical concepts, including the nature of *novelty* in the human encounter with drugs, and human *vulnerability* to drugs in moral, behavioural, and biological dimensions. This chapter will explore a contrasting viewpoint that follows from anthropological ethnohistory and evolutionary theory. We will draw from several of our previous publications to demonstrate that human evolution and history has entailed a long and dynamic relationship with ‘drugs’ that has been active and functional, rather than passive and vulnerable; and that fundamental ecological dynamics, not reward and reinforcement, have been the primary ‘cause’ of human drug use (Sullivan and Hagen, 2002; Sullivan et al., 2008; Hagen et al., 2009, 2013; Roulette et al., 2014). We will close by proposing that an *active* rather than a *passive* human drug-use dynamic has implications for drug policy and clinical practice.

## **2.2 The paradox of drug reward**

According to Sullivan et al. (2008)

The use of psychoactive substances is one of the most perplexing human [behaviours. Some substances cause immeasurable harm to individuals and societies (e.g. heroin), or impose a tremendous social burden in the form of preventable chronic illnesses

(e.g. tobacco), while others appear to be mostly harmless and are widely enjoyed by people around the world (e.g. coffee and chocolate). Historically [and conceptually], a broad range of psychosocial, behavioural, and neurobiological theories seeking to understand drug phenomena are [unified] by the notions of reward and reinforcement (Thorndike, 1911). According to these theories, recreational drugs reward and/or reinforce consumption, often via hedonic effects (Koob and Le Moal, 2005; Nessler, 2005).

All ‘commonly used psychoactive drugs are secondary metabolites of plants or fungi (e.g. alkaloids) or their close chemical analogues’ (Sullivan et al., 2008) (Table 2.1). (Ethanol is the only commonly used drug that is not a plant toxin and therefore falls outside the boundaries of the current discussion; see Dudley (2002).)

**Table 2.1** Relationships between commonly used plant toxins and the human nervous system.

Receptor	Neurotransmitter	Plant toxin	Plant	Drug
Nicotinic	Acetylcholine	Nicotine <sup>a</sup>	<i>Nicotiana, Duboisia</i>	Tobacco, pituri
Muscarinic	Acetylcholine	Arecoline <sup>a</sup>	<i>Areca catechu</i>	Betel nut
Adrenergic	Norepinephrine	Cocaine <sup>c</sup>	<i>Erythroxylum</i>	Coca
	Epinephrine	Ephedrine <sup>c</sup> , cathinone <sup>a, c</sup>	<i>Catha edulis</i>	Khat
Serotonin	Serotonin	Mescaline	<i>Lophophora</i>	Peyote
Dopamine	Dopamine	Cocaine <sup>c</sup>	<i>Erythroxylum</i>	Coca
		Cathinone <sup>a, c</sup>	<i>Catha edulis</i>	Khat
Adenosine	Adenosine	Caffeine <sup>b</sup>	<i>Coffea, Cola nitida</i>	Coffee, cola nut
		Caffeine <sup>b</sup> , theophylline <sup>b</sup> , theobromine <sup>b</sup>	<i>Camellia sinensis</i>	Tea
		Theobromine <sup>b</sup>	<i>Theobromine cacao</i>	Chocolate
Opioid	Endorphins	Codeine <sup>a</sup> , morphine <sup>a</sup>	<i>Papaver somniferum</i>	Opium
Cannabinod	Anandamide	$\Delta$ 9-THC <sup>a</sup>	<i>Cannabis sativa</i>	Cannabis

THC, tetrahydrocannabinol.

<sup>a</sup>Receptor agonist.

<sup>b</sup>Receptor antagonist.

<sup>c</sup>Re-uptake inhibitor.

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