# THEORY OF ADDICTION

Second Edition


Robert West
Jamie Brown

WILEY Blackwell

Addiction Press

# Theory of Addiction

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# Theory of Addiction

## Second Edition

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WILEY Blackwell

Addiction
**Press**

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# PREFACE

The first edition of Theory of Addiction summarised the major theoretical approaches that attempt to explain the range of phenomena that we call 'addiction' and synthesise these into an overarching theory that captured their main core features. It was borne out of a need for a single model that could account for features of addiction that involve conscious choice, powerful desires and impulses, and attempts at, and failure of, self-control. It needed to bring in ideas of pleasure-seeking as well as relief from mental and physical discomfort. It needed to account for individual differences in susceptibility to addiction and explain when and why many addicts 'recover' without help but also why some interventions help some addicts. It needed to explain why population-level interventions such as price increases and reductions in availability can influence the prevalence of addiction and why some medicines can help addicts recover without appearing to provide any of the functions provided by the addictive behaviour.

Given that motivation lay at the heart of addiction it became apparent that a theory of addiction needed to be built on a theory of motivation, and that involved creating a synthetic model of motivation. A first draft of a theory was constructed, aiming to be as parsimonious as possible, while still accounting for the full range of 'big observations'. The goal was not only to explain, but also to generate hypotheses about how one might intervene more effectively to combat addiction. It was always intended that the theory would continue to develop, both in order to account for more observations and to make it more useful when it comes to designing interventions.

Since the first edition was published, new findings have accumulated and experience has been gathered in communicating the theory. After 6 years, it seemed appropriate to update the book to take account of this. Important revisions include the following:

1. Updating the definition and conceptualisation of addiction.
2. Updating descriptions of theories in the literature.
3. Providing a functional classification of theories and models of addiction.
4. Providing a description of core concepts involved in these theories.
5. Updating the description of the synthetic theory of addiction (PRIME Theory) to improve clarity and take account of new observations.

6. Assessing PRIME Theory in the light of new evidence.
7. Setting the PRIME Theory motivation in the context of a more general theory of behaviour that also incorporates capability and opportunity.

The theory is still very much 'work in progress'. There is much to be done to fill in gaps, test assumptions and examine how far the theory adds value when designing interventions.

# Chapter 1
# INTRODUCTION: JOURNEY TO THE CENTRE OF ADDICTION

*This book aims to take you on a journey. The starting point is the simplest possible common-sense theory of addiction and the destination will be a theory that accounts for the available evidence on how addiction develops, who becomes addicted, what they become addicted to and how some of them recover. The path is traced by exploring with successive versions of the theory how it needs to be extended or changed to take account of the available evidence. The goal is to arrive at a theory that is comprehensive yet parsimonious, coherent, and above all useful. It aims to stimulate research and to guide clinicians and policy makers in coming up with better ways of tackling this global scourge. This is a continuing journey. As new evidence emerges and better ways of explaining the evidence are brought to light, the theory will need updating.*

## Preparing for the journey

### Many theories but not much progress

The field of addiction is not short on theories. There are psychological theories, biological theories, sociological theories, economic theories, biopsychosocial theories and more. Almost all of the theories in the field of addiction capture important elements of the phenomenon. The problem is that each theory seems to stem from an idea or set of ideas that accounts for a part of the problem but does not account for other features that were previously addressed by other theories. They view addiction from a particular perspective and focus on what is immediately visible from that point of view. They neglect key features that are visible from other points of view. This militates against developing an 'incremental science' of addiction in which new theoretical principles build on what has gone before, correcting areas where they fail to account for data and creating new avenues for exploration.

### Theory and observation

Part of the problem appears to be that we have adopted a model of science that does not quite fit the area of study. In behavioural science, we have developed our

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methods from the paradigm of the natural sciences; but unfortunately, they have not always served us well. In the prevailing paradigm, the primary source of evidence is the formal study: the survey, the experiment, the semi-structured interview and so forth. Observation of behaviour in the natural habitat is considered 'anecdotal'. The problem with this is that what one might call the 'big' observations about what people do a lot or never do become less important than percentages in surveys, 'significant differences' between groups and 'correlations' between variables. In many cases, these involve rather trivial behaviours in unrealistic laboratory situations or taking at face value people's reports of their attitudes, beliefs and behaviours on questionnaires or in interviews. Very often this gives us an inaccurate portrayal of real behaviour, thoughts and feelings about things that really matter. The responses are too often a pale shadow of, and bear little relationship to, what happens in the world at large.

That is not to say that formal studies are not vital to description, and hypothesis generation and testing. Only that it is important not to lose sight of the value of careful naturalistic observation and detective work when trying to find explanations for behaviour. A simple example can illustrate this. People do not get addicted to listening to music, making the bed or taking aspirin. Listening to music can be very pleasurable; making the bed is functional; and taking aspirin provides relief from pain. A theory of addiction has to be able to explain why these pleasurable, functional and self-medicating behaviours are not addictive while gambling, smoking and drinking alcohol are. As we are aware, no formal study has been done on the addictive qualities of the former but the simple observation is potentially illuminating.

## Need for a synthetic theory

The theory developed in this book aims to provide a conceptual framework within which the major insights provided by the existing theories can be placed. It is a synthetic theory in the sense that it attempts to pull together the accumulated wisdom. It does not attempt to explain *everything* there is to explain, but it does seek to explain the 'big observations' and provide a conceptual system in which the existing theories can be located. It aims to be as parsimonious as possible: that is to say, it only brings in additional elements if they are needed. It strives for coherence: the ideas should relate naturally to each other and not be just a list of unconnected assertions.

## A guiding principle

In attempting this task, we are mindful of the words of Nick Heather (Heather 1998), which we can do no better than to quote verbatim:

> 'addiction . . . is best defined by repeated failures to refrain from drug use despite prior resolutions to do so. This definition is consistent with views of addiction that see decision-making, ambivalence and conflict as central features of the addict's

> behaviour and experience. On this basis, a three-level framework of required explanation is (needed) consisting of (1) the level of neuroadaptation, (2) the level of desire for drugs and (3) the level of "akrasia" or failures of resolve ... explanatory concepts used at the "lower" levels in this framework can never be held to be sufficient as explanations at higher levels, i.e. the postulation of additional determinants is always required at Levels 2 and 3. In particular, it is a failure to address problems at the highest level in the framework that marks the inadequacy of most existing theories of addiction.' (p. 3)

While addiction as conceived in this book has to be broader than just drug use, Professor Heather's point about the inadequacy of explanations at higher levels seems to us to be well made. Thus, neurophysiological models of the actions of particular addictive drugs on specific brain pathways are important and can help us design medicines to help treat the problem. But it is foolish to imagine that they are theories of addiction given their patent failure to address important observations about social and psychological determinants or indeed other brain mechanisms.

We are also aware of the fact that there already exists in the literature a scholarly and eclectic account in the form of Jim Orford's model 'Excessive Appetites' (Orford 2001). The new theory seeks to build on the work of Professor Orford while paying close attention to the admonitions of Professor Heather.

### A psychological orientation

We are psychologists by training and our main field of research is tobacco. Both of these things will inevitably affect our approach and the examples we use. It is difficult for theorists to write convincingly in areas that are not their discipline (e.g. neuropharmacologists or economists writing about psychology), and equally difficult for researchers to demonstrate proficiency in areas of addiction that are not their specialty (the alcohol researcher writing about tobacco or the tobacco researcher writing about cocaine) and many do not even try. But we must try because if we do not, we will fail to grasp what addiction is all about. Since the first edition of this book, we have had the opportunity to discuss the ideas with many colleagues studying different forms of addiction and have been heartened by the extent to which those colleagues have considered that the ideas translate well to their areas of study.

## In the end

So the book is a journey from the most common sense and simple explanation of addiction to one that is only as complicated as it needs to be. The narrative is punctuated with references to many of the theories that have been proposed, together with comments on these.

These are not just summaries. In any event, it is not possible to do justice to the theories in the space available; some of them take up whole volumes. We attempt to draw out the theories' unique insights or important lessons that may be drawn from them. Where possible, the developing theory uses concepts that already exist in the minds of well-informed non-specialists and use words that serve non-psychologists well in explaining and predicting each other's behaviour. We try to avoid the pitfall of needlessly constructing new terms or making up new meanings for existing ones.

This book uses the device of putting existing theories that it discusses in boxes. In some cases, the theories are described very briefly and in others, they are considered in much more detail. The level of detail is not related to the complexity or importance of the theory but only to what is required to draw out the lessons for the purposes of taking forward the journey to a comprehensive theory of addiction.

## The starting definition of addiction

There are many different ways of defining addiction, by which we mean that there are many different things to which the label addiction can be applied. The next chapter will address this issue in more detail but we need to get started on the right foot, so it should be stated here that we will use the term to refer to a chronic condition in which there is a repeated powerful motivation to engage in a rewarding behaviour, acquired as a result of engaging in that behaviour, that has significant potential for unintended harm. It is not all-or-none, but a matter of degree. Its severity can be assessed, amongst other things, by the severity of subjective urges or cravings, a frequency or intensity of behaviour that is causing harm and failure of serious attempts to limit or cease the activity. This definition differs in some respects from others that are widely used. The reason is that we believe that it captures more precisely the phenomena that most of us working in the field need to be captured and excludes broadly similar phenomena that we would want excluded.

## Addiction and motivation

Putting motivation at the heart of addiction means that any theory of addiction needs to be based on a theory of motivation. It makes sense to think of addiction as a disorder of motivation. Although many aspects of motivation are well understood, surprisingly there appears to be no truly synthetic theory that brings them all together. Therefore, this book attempts to provide one. Hopefully, the theory will have value outside the study of addiction.

## Establishing base camp

To achieve the goals set out above is no small matter. To bring on board an expert readership made up of researchers who have their own ideas about how addiction should be construed is even more challenging. Nevertheless, the goal

seems worthwhile and if the ideas presented are logical and contain enough new insights, perhaps this theory will provide a basis from which we can start an incremental science of addiction research. We can start replacing the parts that are contradicted by evidence with new, better parts, finding more coherent or simpler accounts that explain all the things that this theory explains, or adding new theories within the structure of this one. That is what we sought to do with the draft of the theory set out in the first edition of Theory of Addiction. This edition continues the process of development.

## What this book does

Many of the ideas in this book are quite novel and may take some getting used to. To try to help with the process of understanding it, what follows provides some pointers:

- This book develops a draft of a *synthetic theory of addiction* that draws into a single system the mechanisms underlying it: learning through reward and punishment and by associations; feelings of compulsion and desire; the exercise of self-control, beliefs, decisions and plans.

  The theory is based on a *synthetic theory of motivation* that focuses on the *moment-to-moment* control of actions through causal pathways of varying lengths and levels of complexity from simple reflexes, through impulses and inhibitory forces, then desires, drives, and emotional states, to evaluations and plans. It emphasises the fact that for any element to influence behaviour, *it must do so through impulses and inhibitory forces operating at the time*.
- The book argues that the functioning of the brain has evolved to be *inherently unstable*; the motivational system is built like a 'fly-by-wire' aircraft with built-in instability that requires constant balancing input to keep it 'on the straight and narrow'. This has the advantage of making us highly adaptive and creative but the disadvantage that, without balancing inputs, including devices and techniques to stabilise our mental processes, we readily develop maladaptive thought processes and behaviour patterns.
- The book argues that this pattern of activity can be understood in terms of the concepts of the '*epigenetic landscape*' proposed by Waddington (1977) to explain embryological developments, and *chaos theory*, a mathematical approach to modelling systems such as weather patterns. In chaos theory, systems can descend into particular states ('Lorenz attractors' are examples of these) but still switch apparently unpredictably to other states or even move in a *pseudo-random* fashion between them.
- The book argues that addiction develops in susceptible individuals from a failure of balancing inputs leading the *motivational system* concerned into a condition such that particular forces have an unhealthy dominance.
- The book recognises that the disorder of motivation that we call 'addiction' can arise from many different causes. The idea is that addiction is associated with widely varying underlying pathologies and a number of *different syndromes*

(such as the alcohol dependence syndrome). These pathologies involve disorders with varying combinations of abnormally strong impulses, abnormal drives, abnormal emotional states or abnormal mechanisms for restraint.

Sometimes the pathology is present in the individual quite independently of the addictive behaviour. Sometimes the pathology arises from a susceptibility of the individual to the effects of the addictive behaviour or drug. And sometimes it is the individual's environment that is pathological and most 'normal' individuals would succumb in such situations.

Often the pathology shows itself as a syndrome that goes beyond addiction *per se* but involves other classic symptoms (as in the alcohol dependence syndrome already mentioned). But across the different types of addictive behaviour, the pathologies often interact with environmental conditions to result in widely varying manifestations of the symptoms from frequent, low-intensity adoption of the addictive behaviour through to relatively infrequent bingeing. The same drug can lead to different patterns of addictive behaviour in different social and environmental conditions.

- The book proposes a change to the *diagnosis of addiction*. It argues that the assessment should focus on gathering evidence for the degree of dominance of the motivational forces underpinning a behaviour. This is the 'strength' of addiction. It is conceptually necessary to distinguish this from 'severity' which concerns the degree of harm caused by the addiction. There is a move in the American Psychiatric Association's Diagnostic and Statistical Manual V (DSM-V) to combine the two because they are so highly correlated in a given culture. But that leads us to ignore the cultural factors that generate harm from an addictive disorder. For example, if a society chooses to impose draconian punishments on behaviours such as ecstasy use, it can raise the severity without affecting the strength. For clinicians, the next step after diagnosis of addiction would be to try to determine where the pathology or pathologies lie and what are the prospects in the short and medium term for treating these. This would inform the decision about how much emphasis to place on treating the underlying pathology or simply suppressing the symptom (the addictive behaviour).

  Further, if one is to treat the underlying pathology, what are the prospects for an acute treatment episode that will result in a lasting effect, will chronic treatment be required, or is the best model one where treatment episodes are repeated as required? *Symptomatic treatment* involves harnessing additional motives to bolster restraint and minimise the manifestation of the impulses to engage in the behaviour. *Treatment of the underlying pathologies* involves pharmacological and psychological interventions to treat, or permanently normalise, the disorders of the motivational system.
- The book proposes an approach to the development of *population-level interventions* to prevent or control addictive behaviour that takes account of the whole of the motivational system (impulses, desires, evaluations and plans). It states that, equally importantly, interventions should be based on a calculus of the forces operating on individuals *at times when the activity is currently occurring or being planned*.

- This book argues that our existing approach to theory development and testing is not conducive to 'incremental science' but rather a plethora of theories that have much in common but use different formulations or that focus on just one aspect of the matter in hand and fail to address other important aspects. Moreover, the methods we use to test theories, such as correlation coefficients and regression, are often not up to the job. We should also be looking for counter-examples: a single genuine counter-example means that the theory must be wrong and prompts the search for improvements.
- This second edition continues the processes started with the first in 2006 of building an incremental science of addiction, with new theoretical ideas being proposed that do a better job at explaining and predicting behaviour within a common integrative framework, rather than just drawing attention to new insights that explain some things better but fail to address other observations that were adequately explained by previous theories. It also seeks to find better ways of explaining and describing the theory and its application.

## The synthetic theory of addiction in brief

To start the ball rolling the following paragraphs will outline some of the statements made by the theory. This will involve some repetition. This is deliberate: ideas often take several exposures in different contexts to be understood—this is just the beginning.

### Addiction is

Addiction can arise from many different pathologies, and varies in its strength, severity and manifestations. Addiction involves a chronic condition of the *motivational system* (see next section) in which there is an abnormally and damagingly high priority given to a particular activity.

The pathologies underlying addiction come in *three basic types*:

- Abnormalities in the motivational system that were not directly caused by the addictive activity (e.g. related to chronic anxiety, depression, low self-esteem, poor impulse control, etc.).
- Abnormalities in the motivational system caused by the addictive activity acting on susceptibilities in that system (e.g. sensitisation to the effects of stimulant drugs, tolerance and withdrawal symptoms, and mood disturbance arising from social effects of the behaviour).
- Pathological environments acting on essentially normal motivational systems that are not equipped to cope with them (e.g. sometimes the lifestyle of public icons, particular social relationships and people in chronically distressing circumstances).

  In many cases, the underlying pathology involves more than one of these interacting with each other.

## The 'motivational system'

The motivational system is the set of brain processes that energise and direct our actions. It consists of five interacting subsystems: (1) the response subsystem generates responses, (2) the impulse–inhibition subsystem generates impulses and inhibitions that feed into this, (3) the motive subsystem generates wants and needs that feed into this, (4) the evaluation subsystem generates beliefs about what is good and bad that feed into this and (5) the planning subsystem generates self-conscious intentions that feed into this.

Motives can influence behaviour only through impulses and inhibitions, evaluations can do so only through motives, and plans operate on motives and evaluations.

## Impulses, motives and plans

Leaving aside simple reflex responses, actions result only from *impulses* and *inhibitory forces* operating at that moment in time, and these result from stimuli/information and from motives operating at that time. Thus, motives operate through impulses and inhibitions, and evaluations operate through motives. We think that plans influence actions primarily through evaluations but it is possible that they may act directly on desires.

The way that the motivational system is structured imparts an inherent (though not paramount) primacy to the immediate environment in terms of influences on our actions and a primacy of desires and urges over evaluations and plans.

Motives and impulses derive from interactions between *external stimuli* and *drives* (e.g. hunger), *generalised emotional states* (e.g. happiness, sadness, excitement) and *targeted emotional states* (e.g. liking, disliking). The strength of a given motive derives from the strength of associated emotions and drives. The direction of the motive derives from the nature of the drives and whether the emotions are positive or negative.

## Learning by association

*Occurrence* and *repetition* of particular associations within the motivational system lead to facilitative links being formed so that when one element occurs the other elements are triggered more readily. This is *associative learning*.

*Stimulus–stimulus* associations underlie 'Pavlovian (classical) conditioning' while *stimulus–response–outcome* (reward or punishment) associations underpin what is called 'instrumental (operant) learning'. Associative learning is a general property of the brain, which underpins creative thoughts and propositional learning and habits and skills. Thus, what we have come to think of as classical and operant learning are two examples of a wide range of possible types of association between mental activities.

The term *habit* in this view refers to any activity that involves a significant element of automaticity through stimulus–impulse or stimulus–inhibition learning.

## The unstable mind

The pathologies underlying addiction develop because the human mind and the physiological systems that give rise to it have evolved to be *inherently unstable* and require constant balancing input to prevent them heading off in unwanted directions. This instability is what makes humans highly responsive to environmental events, creative and adaptable but at the cost of a tendency to descend into maladaptive patterns of thought and behaviour in the absence of balancing input.

A useful way of visualising this is *Waddington's 'epigenetic landscape'*. This characterises the state of an organism as a ball rolling down a contoured landscape with valleys and plains. At bifurcations in the valleys, small environmental forces can lead the ball down one path or another. Addiction represents a particularly deep valley, which would require very powerful sustained input to escape from.

In principle, this approach can be modelled using mathematical concepts of '*chaos theory*'. 'Chaotic systems' (such as weather) exhibit characteristic patterns: they involve periods of short- to medium-term stability punctuated by apparently unpredictable switches in state or periods of violent instability resulting from apparently small events; the paths that two systems follow can diverge markedly as a result of very small differences in their starting points; on occasions, the system can become fixed in a particular state without the possibility of escape under any realistic conditions, while on other occasions, it can apparently show this pattern only to suddenly switch states.

The *motivational system* seems to fit this chaotic adaptive model, and addiction represents a particular kind of activity of the system. For most people under most conditions, the motivational system has checks and balances that prevent any one set of motivational forces dominating for a protracted period. However, some circumstances (a pre-existing pathology in the system, changes to a susceptible system stemming from a given set of actions or a particular set of environmental inputs to the system) lead it to enter a state in which the inputs are not sufficiently balanced for that particular system and it is 'attracted' to an addicted state where a given set of motivational forces are inadequately balanced by competing influences.

This book is an essay. We have tried to communicate the ideas as best as we can, but each chapter could be a book in itself and this text is not attempting to include that level of detail. Instead, we aim to present a wider view of addiction theory. We hope we have done justice to the subject and, even if you do not agree with everything in the book, we still hope you find it stimulating.

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# Chapter 2
# DEFINITION, THEORY AND OBSERVATION

*This chapter discusses the issue of definitions in the social and behavioural sciences. It develops a definition of addiction based on what appears to be current usage. It then examines what makes a good theory and finishes with a summary of some of the 'big observations' that a theory of addiction needs to accommodate.*

## Defining addiction (addiction is not an elephant)

This section explores the issue of definition of addiction and related concepts. It accepts the intention behind most major definitions of addiction but suggests a particular wording to achieve this intention.

### What are definitions?

When we notice similarities between different 'entities' (things, substances, situations, events or attributes), we give them labels so that they can be thought of as categories and treated similarly. We then describe the features of the category of entity to which the label applies so that we know when to apply the label. Those descriptions are definitions.

Definitions are surprisingly difficult to formulate precisely in a way that covers all eventualities even for concrete objects such as furniture or large mammals such as elephants. For example, we all know what an elephant is. It is a large quadruped with a thick skin, big ears and a long proboscis. But are these absolute defining features? They cannot be. For example, what about an elephant that was born with three legs or that had had its trunk amputated in a freak logging accident? With modern science at our disposal, we could define elephants in terms of their DNA, but for most purposes that would be impracticable and unnecessary. Thus, in practice, we go by what elephants look like and make allowances for the exceptions and we generally know an elephant when we see it – even if it only has three legs.

So what about addiction? Addiction is an abstract concept, like love and fairness. It has no objective existence and boundaries as would, for example, a chair or an elephant. Furthermore, it is socially defined which means that opinions can

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legitimately differ about what it is that we want the label to be associated with; it cannot be said that one definition is unequivocally correct and another incorrect, only that one is more useful or is generally agreed upon by 'experts'. Despite this, 'addiction' is an important concept in behavioural and clinical science. According to the US National Library of Medicine database, the word is found in the title or abstract of some 40 000 scholarly articles dating back to 1914.

## The changing definitions of addiction

The Oxford English Dictionary traces the term 'addiction' back to Roman Law where it involved 'the formal delivery of a person or property to an individual, typically in accordance with a judicial decision'. While this invokes the idea of relinquished control, the first recorded use with a modern meaning appears much later in the early eighteenth century: 'The Doctor . . . made a Forfeit of them, by his too great Addiction to the Bottle, after a very uncourtly manner' (Oxford English Dictionary). This is not to say addiction is a new phenomenon – there are several instances of ancient Egyptian and Greek writings that clearly demonstrate their understanding of the issue. For example, Diodorus and Plutarch noted that 'drink madness is an affection of the body which hath destroyed many kings and noble people' (American Association for the Study and Cure of Inebriety 1893).

By the end of the nineteenth century, physicians were becoming increasingly interested in the scientific study of addiction. The first meeting of what is now the Society for the Study of Addiction was held in 1884 and their scientific ambition required the lay understanding of addiction to be formalised. Early efforts in this direction focused on establishing addiction as a medical disease rather than a moral or spiritual issue. The society defined 'it as a diseased state of the brain and nerve centres characterised by an irresistible impulse to indulge in intoxicating liquors or other narcotics, for the relief these afford, at any peril' (Kerr 1884). Definitions serve a purpose and the necessity of the time was to convince society to treat addiction as a medical problem rather than denounce it as a moral failing.

Definitions in authoritative texts on the subject continued to evolve as knowledge accumulated. However, for a long period, there remained the same theme of addiction involving a state of physiological adaptation to presence of a drug in the body so that absence of the drug leads to physiological dysfunction which is manifest to the sufferer as unpleasant or even life-threatening 'withdrawal symptoms'. An addict was someone who needed to take a drug in order to maintain normal physiological functioning.

For many members of the public and some researchers, this concept of addiction still holds sway. They have an image of the heroin addict suffering stomach cramps, runny nose and shivering or the alcoholic with hands shaking uncontrollably. In some ways, this definition is attractive because it points to a physiological problem with a known or at least discoverable aetiology and mechanism of action. There is a physical abnormality that can be measured objectively and perhaps treated.

The situation has changed considerably in recent years. Nowadays, the term 'addiction' tends to be applied to a syndrome at the centre of which is impaired

control over a behaviour to a degree that is causing or could cause significant harm. The fact that there is harm is important because otherwise addiction would be of limited interest. It certainly would not merit spending large sums of public money researching, preventing and treating it. There is impaired control in that an addicted individual feels a compulsion to engage in the activity concerned or else it takes on a priority in his or her life that seems excessive. In many cases, but not always, the addicted individual expresses an apparently sincere desire not to engage in the activity but fails to sustain abstinence.

In this formulation, addiction does not just involve control: there is a syndrome that includes a heterogeneous collection of symptoms. This syndrome and associated diagnostic criteria are based on the alcohol dependence syndrome set out by Edwards and Gross (1976). Thus they still include withdrawal symptoms, cravings and tolerance (reduced drug effect with repeated use), of which more later.

The reason for the change in the way addiction has been conceptualised is that withdrawal symptoms in themselves pose little social threat and are clearly not the main problem. Even where they are unpleasant or dangerous, they are of limited duration and can be treated. By contrast, the compulsion to use drugs or engage in particular behaviours poses a very serious long-term threat to the well-being of sufferers and others and is very difficult to tackle with interventions that are practicable and ethical. It is a much more deserving focus of attention.

## Current variation in definitions of addiction

For some researchers, addiction only involves drug-taking behaviour. However, there are strong reasons for extending it to other activities such as gambling. And some would argue that it should be extended further to use of the internet, consumption of palatable foods, purchasing behaviour and sexual behaviours (Padwa and Cunningham 2010). Yet including behaviours other than drug use within the definition causes a problem. It is not a trivial matter to differentiate addiction on the one hand from involuntary tics and obsessive compulsive disorder on the other. Part of the solution seems to be inclusion of the term ‘rewarding’ in the definition as well as an acknowledgement that the behaviour should be acquired as a result of experience. Thus the definition becomes: ‘a syndrome at the centre of which is impaired control over a rewarding behaviour, acquired as a result of engaging in that behaviour’.

## Addiction and dependence

It may be useful to distinguish between addiction as a repeated powerful motivation to engage in a rewarding but harmful behaviour and ‘physical dependence’ as a state of physiological adaptation to a drug which then needs to be taken to prevent adverse withdrawal symptoms. One may even talk about ‘psychological dependence’ to refer to a state in which an individual, for whatever reason, feels that he or she ‘needs’ something. But addiction and dependence are often used interchangeably and it is unlikely that we will ever be in a position where there is a strong enough consensus on the definition of and distinction between these terms

to arrive at a universally acceptable terminology. Instead, the situation is likely to persist where usage of different terms is led by political or social considerations.

During the 1980s when the American Psychiatric Association (APA) was deciding the classification for DSM-III, there was disagreement between committee members as to which label should be used (O'Brien et al. 2006). Proponents of 'addiction' felt that it conveyed the compulsive nature of drug-taking and distinguished this from 'normal' physical dependence symptoms arising from the routine use of certain medications that may or may not be psychoactive, while those preferring 'dependence' felt it less stigmatising and more easily applicable to all drugs including nicotine and alcohol. The term 'dependence' won by a single vote in one of the final meetings and the APA followed in the footsteps of the WHO which had for similar reasons replaced all reference to the term 'Addiction' with 'Dependence' in 1964.

Fast forward to the present, and it appears that the fifth version of the DSM to be published in 2013 will replace 'Dependence' with 'Addiction' (or at least 'Addictive Disorders'). The re-think has been driven not by a radical re-structuring of the diagnostic criteria – few changes are intended beyond reducing the number of qualifying symptoms that patients are required to have experienced in the past year from three to two and expanding the symptom list to include cravings and several more instances of problematic or harmful use (see www.dsm5.org and Table 2.3 on DSM-IV below). Instead, the critical factor has been the belief of the committee that any harm relating to 'Addiction' stigma has been overshadowed by the reluctance of some clinicians to deliver appropriate medication to patients displaying any signs of tolerance and withdrawal for fear of clinical dependence. Many welcome the change including those involved in the original decision, who now regard it as a 'serious mistake' (O'Brien et al. 2006). Of course, not everyone agrees (Erickson and Wilcox 2006).

Interestingly, in common parlance we tend to use different terminology for different addictions: we usually say 'heroin addiction' not 'heroin dependence' but 'alcohol dependence' not 'alcohol addiction'. With benzodiazepines we tend towards 'dependence' rather than 'addiction'. With nicotine and stimulants we feel about equally comfortable with either term. At the risk of using a language that reads rather strangely, this book will try to use the term 'addiction' to refer to the syndrome at the heart of which is a repeated powerful motivation to engage in a rewarding but harmful behaviour and mostly avoid the term dependence. However, use of language sometimes provides clues to how well underlying concepts fit together and it is worth considering whether the different application of the terms 'dependence' and 'addiction' to different drugs reflects differences in the phenomenology of the problem.

## Addiction and intoxication

A position that is no longer seriously advocated is that there must be intoxication for addiction to occur (Robinson and Pritchard 1992). In fact, even at the time the position appeared incompatible with the evidence and was fiercely contested (West 1992; Hughes 1993). Such arguments can be understood by realising they need not be founded on a search for truth; definitions and labels can have far

reaching social, political and commercial consequences. Thus in the 1990s it was important to tobacco companies that nicotine not be considered addictive and including intoxication as a defining feature allowed them to make this claim.

The proponents of the intoxication view were arguing that because nicotine is not intoxicating it is not addictive and so smokers were freely risking lung cancer in choosing to smoke – 'because they like it'. This would mitigate the blame attaching to the tobacco industry for promoting and selling the only product in the world, apart from the suicide pill, that is lethal to the user when used exactly as intended by the manufacturer.

Individuals and professional groups are of course at liberty to define addiction in a way that meets their own needs. Some psychologists may feel comfortable with a psychological definition that emphasises the role of decision-making and choice, whereas behavioural pharmacologists may feel more comfortable with one that emphasises learning mechanisms and brain pathways.

Some smokers, who need to feel that they are in control, may prefer to think of addiction in terms that exclude smoking whereas others who need to feel comfortable about the fact that they have tried and failed to stop many times may be attracted to one that includes it. However, at some point we need to agree that a particular definition serves the purposes of research, clinical practice and policy better than others and that is what has happened with the adoption of a version of the Edwards and Gross conceptualisation.

## Everyday usage of 'addiction'

It is interesting to see what non-specialists regard as addiction. We asked a number of people with no formal grounding in the field of addiction or behavioural research, but who are thoughtful and intelligent, to say what they thought addiction was. Here are the responses.

*NB (Composer of a musical about alcohol dependence)*: 'Addiction is, amongst many other things, probably as many things as there are addicts. . . . 1. The constant attempt to try and fill a perceived lack of something, real or imagined, 2. A way of never having to say what you really feel . . . the consequence, or maybe the origination, being a physical, emotional and chemical dependence'.

*CW (Theatre producer and manager)*: 'An addiction is something we can't stop doing without some kind of intervention; but then so are breathing and compulsive behaviours . . . perhaps there's a lack of rational justification for the addiction and some sense that the addiction itself continues to "make us do it" (and the judgement that the addiction is "bad"). Do we mix up addictions and compulsions? There seems to be a difference. Are addictions purely chemical and everything else compulsive behaviour? We usually recognise non-physical/chemical components to addictions but at the same time are familiar with an addict's attempts to justify their addiction as part of the addiction itself. Common usage of terms like "physically addictive", "psychologically addictive" and "addictive personality" suggests not only different kinds of addiction but also different attitudes to addiction. It is hard to keep a sense of "good" and "bad for you" out of it. So what am I trying to

say? Addiction is something you don't need to do (not something connected to survival) but you can't stop yourself doing (not without help/suffering/effort) and it's somehow self-perpetuating (it becomes a goal in itself). I'm reminded of philosophy classes (what would a philosopher say?), e.g. knowledge = justified, true belief plus a connection between justification and what makes the belief true (to avoid counter-examples) and the ancient Greek concept of akrasia (weakness of the will, or choosing the lesser "good") which is relevant to addiction (as soon as you analyse an example of weakness of the will it disappears because understanding it means it's no longer irrational behaviour and so no longer weakness of the will so is there such a thing?). Perhaps we do addicts a disservice understanding them and so justifying their addictions? We should rather tell them to…'

*CC (Retired nurse)*: 'Addiction is compulsive behaviour in a certain direction. It gives you pleasure. If a person is prone to addiction, if they are not addicted to one thing they will be addicted to something else. It is caused by a genetic susceptibility. The way to tackle addiction is to transfer it to something less harmful and reward them for doing it or put a more powerful motivation in place.'

*CD (Author and actor)*: 'For me, addiction is: security, only noticeable in its absence. A nag in the head. Can say nothing, do nothing, think nothing but "Want a fag". Nothing else will hit the spot, but it doesn't. It's disappointing but the best thing at the same time. And still thinking "The next one will do the trick". A cigarette every half an hour is like having a hug for a dull and miserable life. The alternative is to whine constantly, and who wants to listen to that? So, smoke, smoke, smoke – cheaper than therapy.'

It is remarkable how these off-the-cuff, non-expert views capture much of the discussion that has gone into arriving at the current technical formulation.

## Commonly used formal definitions

Table 2.1 shows a range of commonly used definitions of addiction/dependence and comments on how far and in what way they meet or fail to meet a need to include and exclude behaviours that need to be included or excluded.

## Arriving at a working definition

There are two further tweaks of wording that are needed to implement what seems to be the intention behind most usage. The conventional formulation talks of 'impaired control'. There is a risk that this might imply specifically that the disorder involves a weakening of self-control rather than an increase in drive to engage in the addictive behaviour. This is an empirical matter and is probably best avoided in the definition of the phenomenon. Additionally the focus on impaired control rather than the force causing the impairment excludes the possibility of addictions with the potential to cause harm where no attempt was (yet) being made to exert control. Therefore, the preferred form of words for this book is:

*'Addiction is a chronic condition involving a repeated powerful motivation to engage in a rewarding behaviour, acquired as a result of engaging in that behaviour,*

**Table 2.1** Commonly used definitions of addiction/dependence

| Definition (source) | Comment |
|---|---|
| Addiction is a primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in the individual pursuing reward and/or relief by substance use and other behaviours. The addiction is characterised by impairment in behavioural control, craving, inability to consistently abstain, and diminished recognition of significant problems with one's behaviours and interpersonal relationships. Like other chronic diseases, addiction can involve cycles of relapse and remission. Without treatment or engagement in recovery activities, addiction is progressive and can result in disability or premature death. (American Society of Addiction Medicine) | This considers addiction as a brain disease which implies that it requires treatment. It neglects environmental and social forces at play, the fact that it involves a continuum and that many individuals 'recover' without treatment. |
| Compulsive physiological and psychological need for a habit-forming substance or the condition of being habitually or compulsively occupied with or involved in something (The American Heritage Dictionary, 4th edn) | Broadly based but transfers the burden of interpretation on to words such as 'compulsive', 'need' and 'habit' |
| A physical or psychological need for a habit-forming substance, such as a drug or alcohol. In physical addiction, the body adapts to the substance being used and gradually requires increased amounts to reproduce the effects originally produced by smaller doses. A habitual or compulsive involvement in an activity, such as gambling. (The American Heritage Science Dictionary) | As above but provides a clear definition of 'physical' addiction which represents only a small part of the problem of addiction as currently construed |
| The condition of being abnormally dependent on some habit, especially compulsive dependency on narcotic drugs (Collins English Dictionary) | Transfers the burden of interpretation to 'abnormal' and 'compulsive' |
| Addiction is a persistent, compulsive dependence on a behaviour or substance. The term has been partially replaced by the word *dependence* for substance abuse. Addiction has been extended, however, to include mood-altering behaviours or activities. Some researchers speak of two types of addictions: substance addictions (e.g. alcoholism, drug abuse and smoking) and process addictions (e.g. gambling, spending, shopping, eating and sexual activity). There is a growing recognition that many addicts, such as polydrug abusers, are addicted to more than one substance or process. (Gale Encyclopaedia of Medicine) | Brings in the concept of persistence but transfers burden of interpretation to 'compulsive' and 'dependence' |