CHAPTER 1

Introduction

There is a growing global epidemic that poses a serious threat to humanity. It is not the epidemic of obesity, cancer, heart disease, AIDS, or type-2 diabetes. The epidemic in question encompasses all of these. It is the *epidemic of unhealthy behavior*. Indeed, the main driver of the growing incidence of chronic diseases is the unhealthy behaviors of caloric overconsumption, physical inactivity, cigarette smoking, risky sex, and abuse of alcohol and other drugs (Global Burden of Disease Risk Factors Collaborators, 2017).

What these unhealthy behaviors have in common is that they are a function of personal, albeit often extremely difficult (and not always conscious) choices and are most often performed by individuals who have alternative healthy options available to them such as to eat different and/or less food, to exercise more, to quit smoking, to practice safe sex, or to cut back or eliminate consumption of alcohol and other drugs. In short, the unhealthy behaviors that are the primary drivers of worldwide death and disease are largely a function of each person's motivation to perform (or not perform) those behaviors.

Our inability to sufficiently understand and alter human motivation for unhealthy behavior is a defining problem for twenty-first century behavioral science. In an attempt to address this problem, this book introduces a *Darwinian Hedonism Framework* in which it is argued that (a) human behavior is in large part a function of *psychological hedonism* – the universal human tendency to pursue behavioral outcomes that have previously resulted in pleasure and avoid behavioral outcomes that have previously resulted in displeasure – and (b) the human capacity for psychological hedonism is a function of Darwinian evolutionary processes.

Psychological Hedonism

The hedonism aspect of Darwinian Hedonism – the idea that humans are motivated to pursue pleasure and avoid displeasure – is an ancient way of thinking about human behavior (Moen, 2015). Moreover, this idea is intuitive and therefore often assumed to be true. However, psychological hedonism has largely fallen out of favor as a theory of human behavior in contemporary academic philosophy (there are some exceptions to this, which I will discuss in this book).

Critics of psychological hedonism have come at it from two sides. On the one hand, it is easy to think of examples that run counter to the theory. We often anonymously let people go in front of us in traffic or stop to give directions to a stranger. We are also able to forego immediate pleasure when we diet, try to quit smoking, cut back on drinking, or stop using drugs. And we endure the pain and discomfort of exercise and the dentist's chair. Of course, someone who endorses psychological hedonism can argue that we resist immediate pleasure and endure immediate displeasure in these instances because of the expectation of greater future pleasure or less future pain because of our immediate sacrifices.

This defense of the theory, however, has spurred attacks on another front. Psychological hedonism is so broad and loosely defined that it can always be "rescued" by arguing that any behavior is a function of previous or anticipated pleasures and displeasures. Since someone can always argue that any given behavior is motivated by psychological hedonism, the theory is impossible to refute and thus not useful as a scientific theory.

In this book, I present a contemporary version of psychological hedonism based on recent research in affective neuroscience that provides a means for overcoming these criticisms. The revised version of psychological hedonism that I refer to as the *Theory of Hedonic Motivation* is based on two relatively recent advances in affective neuroscience and psychology.

First, borrowing from the work of Kent Berridge and colleagues (Berridge & Kringelbach, 2013), among others, I argue that human behavior is, in large part, a function of *hedonic motivation* – an automatic desire or dread based on previous pleasures and displeasures. Hedonic motivation can be defined in terms of a specific neurobiological process in the brain and is conceptually and empirically distinct from pleasure and displeasure per se. Consistent with these ideas, in the Theory of Hedonic Motivation, psychological hedonism comprises previous pleasures and displeasures (referred to collectively throughout the book as

hedonic responses), hedonic motivations, and the incentive conditioning process that links the former to the latter.

Second, borrowing from Nobel Laureate, Daniel Kahneman (2011), among others, I argue that hedonic motivation can be distinguished from *reflective motivation* – what we want to do, or want not to do, based on thoughtful consideration of the consequences of our actions. That is, people mean different things when they say, "I want the chocolate cake," or "I want another glass of wine," or "I want to skip my exercise session," versus when people say, "I want to cut back on sweets," or "I want to start drinking less," or "I want to stick to my exercise routine." The former instances of wanting are examples of automatic hedonic motivation to pursue what has previously been immediately pleasurable and avoid what has caused displeasure, whereas the latter instances of wanting are examples of deliberate reflective motivation based on thoughtful consideration of the consequences of behavior.

The Theory of Hedonic Motivation provides the potential for a more precise and circumscribed theory of psychological hedonism that can overcome the criticisms of traditional versions of the theory. That is, the version of psychological hedonism that I present herein is more useful as a scientific theory because the output – hedonic motivation – provides a clear mechanism through which previous pleasures and displeasures influence future behavior. Moreover, hedonic motivation is clearly distinguishable from previous pleasures and displeasures and future behavior, thus allowing it to be an empirically testable determinant of behavior. Finally, because behavior is also influenced by reflective motivation, it allows for counterexamples in which behavior is not a function of previous pleasures and displeasures.

Darwinian Hedonism

The Darwinian aspect of Darwinian Hedonism refers to the grounding of psychological hedonism in principles of evolutionary biology and, in particular, natural selection. Again, this idea is not new. Darwin as well as his contemporary, Herbert Spencer, discussed an understanding of psychological hedonism in terms of natural selection (Darwin, 1871; Spencer, 1876). Although not receiving the attention it deserves, the evolutionary roots of psychological hedonism also have been referred to explicitly in contemporary behavioral science (e.g., Johnston, 2003; Kringelbach & Berridge, 2009; Panksepp, 2013). Moreover, the grounding of psychological

hedonism in natural selection is – like psychological hedonism – intuitive and often generally assumed by non-academics.

However, the idea that the human tendency to pursue pleasure and avoid displeasure is a function of our evolutionary past is (or is likely to be) controversial in multiple distinct academic circles. For example, many social scientists eschew any notion that human behavior is even partly influenced by genetic heritage. Many evolutionary biologists take issue with the lack of evidence for the evolution of mental processes via natural selection. Even evolutionary psychologists, who certainly accept a Darwinian basis for mental mechanisms, tend to argue against broad general-purpose mental mechanisms such as psychological hedonism. Thus, although not a new idea, the concept of an evolutionary basis for psychological hedonism is not, it is safe to say, widely accepted.

In this book, I examine the evolutionary basis for psychological hedonism using the framework proposed by the late Nobel Laureate Niko Tinbergen. Tinbergen (1963) argued that there are four questions that someone can ask about any pattern of behavior: What causes the behavior in the here and now (*proximal causation*)? How does the pattern of behavior, and its proximal causes, develop over the lifetime of the organism (*ontogenetic development*)? Why does the pattern of behavior exist in the first place (*evolutionary function*)? And, how did the pattern of behavior evolve (*phylogenetic development*)?

Darwinian Hedonism is an application of Tinbergen's four questions to the process of psychological hedonism that drives human behavior. The proximal causes and ontological development of psychological hedonism – Tinbergen's first two questions – are addressed in the Theory of Hedonic Motivation. The Darwinian Hedonism Framework encompasses and extends the Theory of Hedonic Motivation to include the evolutionary function and phylogenetic development of psychological hedonism – Tinbergen's second two questions.

Darwinian Hedonism and the Epidemic of Unhealthy Behavior

The new perspective offered by Darwinian Hedonism is critical for addressing the epidemic of unhealthy behavior. The human tendency, for example, to desire calorie-dense foods and dread physical exertion that has no immediate payoff (i.e., exercise) is a function of evolutionarily engrained genetic predispositions. These tendencies are the end-product of thousands of millennia of evolution and were adaptive for our

evolutionary ancestors. However, these same hedonic tendencies are mismatched to modern environments (Gluckman & Hanson, 2006). Thus, there is a *motivational mismatch* between our human hedonic tendencies to eat calorie-dense foods and avoid physical effort and the modern environments in which these behaviors lead to chronic disease and premature death.

To better understand the epidemic of unhealthy behavior, scientists who study the causes of health-related behaviors must place greater emphasis on our evolutionarily primitive hedonic motivations to eat the chocolate cake instead of the fruit salad, skip our exercise session, and smoke, drink, and use illicit drugs, despite our intentions to do otherwise. To control the epidemic of unhealthy behavior, public health practitioners must prevent the triggering of hedonic motivations for unhealthy behavior and/or make such hedonic motivations irrelevant by restricting access to the products associated with unhealthy behavior, such as calorie-dense foods, cigarettes, and alcohol.

Major Themes

Throughout the book I borrow ideas from multiple academic disciplines. As a starting point, I refer to epidemiological data from the field of public health showing that there is a growing epidemic of unhealthy behavior (Global Burden of Disease Risk Factors Collaborators, 2017). From philosophy, I borrow the ancient, but now largely rejected, principle of psychological hedonism as a primary driver of human motivation and behavior (Bentham, 1780/2007; Moen, 2015). From affective neuroscience, I borrow the theory of incentive salience, which distinguishes between pleasure/displeasure and motivation (Berridge & Kringelbach, 2013). From psychology, I borrow the notion of dual-processing, which distinguishes between automatic versus deliberate and controlled cognitive processing (Kahneman, 2011). From behavioral ecology and evolutionary psychology, I borrow the idea that human behavior and its motivational antecedents, including psychological hedonism, are – just like human anatomy and physiology – a function of Darwinian processes (Tinbergen, 1963). Finally, from the emerging field of evolutionary medicine, I borrow the concept of evolutionary mismatch – the idea that human biology and behavioral tendencies, which evolved over millions of years, are poorly matched to rapidly changing human environments (Gluckman & Hanson, 2006).

In isolation these ideas that I just summarized and that I present throughout this book are nothing new. What is novel is the integration of the ideas that results in five major themes representing the essence of this book:

1. As posited in the Theory of Hedonic Motivation, psychological hedonism is the process through which previous hedonic responses (pleasures and displeasures) are translated, via incentive conditioning, into hedonic motivations. Thus, hedonic motivation is the output of psychological hedonism and previous hedonic responses are the input. Psychological hedonism is a major driver of human behavior that results in our automatic desire for chocolate cake, cigarettes, and beer, and our automatic dread of exercise and dental procedures.
2. Automatic hedonic motivations (i.e., the output of psychological hedonism) can be distinguished from deliberate reflective motivations, which are based on thoughtful consideration of the consequences of behavior. These two types of motivation often point toward the same behavior, but sometimes compete, particularly in the context of unhealthy behaviors. For example, we may be hedonically motivated to choose the chocolate cake at the dessert buffet and at the same time reflectively motivated to take the fruit salad instead.
3. There is a Darwinian evolutionary basis for the human capacity for psychological hedonism as well as the specific hedonic response tendencies that feed into it. That is, there is a clear evolutionary basis for the immediate pleasure we experience while eating the chocolate cake and our corresponding desire for the chocolate cake the next time around.
4. The epidemic of unhealthy behavior must be understood in terms of the proximal, distal (ontological developmental), and ultimate (evolutionary) causes of psychological hedonism and hedonic response tendencies.
5. A slowing and eventual reversal of the epidemic of unhealthy behavior will require policies that impede unhealthy behaviors and facilitate healthy behaviors without requiring people to consistently overcome their evolutionarily endowed hedonic motivations.

Each one of these five major themes may stand on its own. For example, one may accept the version of psychological hedonism put forward in the

Theory of Hedonic Motivation, but reject its evolutionary basis – i.e., the Darwinian Hedonism Framework. Likewise, one may accept the Darwinian Hedonism Framework, but not agree on its application to understanding of and/or intervening in the epidemic of unhealthy behavior.

Structure of the Book

To provide a context for Darwinian Hedonism, Part 1 of the book provides some background on the pervasiveness and general intractability of unhealthy patterns of behavior – i.e., the epidemic of unhealthy behavior. Part 1 also provides necessary background on ways of thinking about the causes of behavior, the interrelationship between brain and mind and psychology and neurobiology, and a layout of the contents of the mind in terms of cognition, affect, and motivation.

Part 2 of the book focuses on psychological hedonism and covers the first two of the five major themes. I first provide an overview of traditional versions of psychological hedonism and then offer a contemporary articulation, the Theory of Hedonic Motivation, that serves as a foundation for the remainder of the book. The Theory of Hedonic Motivation outlines the proximal causes and ontological development of hedonic motivation – the posited output of psychological hedonism – thus addressing the first two of Tinbergen's four questions as applied to psychological hedonism. Part 2 also covers the distinction between hedonic and reflective motivation.

Part 3 of the book presents a Darwinian basis for psychological hedonism as formulated in the Theory of Hedonic Motivation, thus covering the third of the five themes. According to this Darwinian Hedonism Framework, psychological hedonism is an evolved mental mechanism that signals us when our behavior is adaptive (or maladaptive) in terms of genetic reproduction and is a main vehicle through which Darwinian forces affect our actions. The Darwinian Hedonism Framework encompasses and extends the Theory of Hedonic Motivation by outlining the evolutionary function and phylogenetic development of psychological hedonism and the hedonic response tendencies that serve as its inputs, thus addressing the second two of Tinbergen's four questions as applied to psychological hedonism.

Part 4, the final part of the book, explains how the Darwinian Hedonism Framework can aid in understanding and addressing the epidemic of unhealthy behavior, thus covering the final two of the five major themes. Specifically, I illustrate how the Darwinian Hedonism Framework

can illuminate and help facilitate change in three of the most damaging unhealthy behaviors: unhealthy eating, physical inactivity, and substance use. Importantly, Darwinian Hedonism does not assume determinism. On the contrary, through our evolved cognitive capacities, humans can adapt to changing environments, and thus set and achieve goals to overcome our hedonistic instincts. I will argue that we can best achieve this by implementing policies that reduce the need for us to overcome our hedonic motivations to change our patterns of unhealthy behavior, and thus lead longer and healthier lives.

A Note on the Difference between Colloquial and Scientific Meanings of "Motivation"

Because this book is largely about human motivation, there is, before proceeding, one more point I wish to make regarding the meaning and use of the word "motivation."

Colloquially, motivation is often thought of as a characteristic that involves will-power, mental fortitude, and the tendency to work hard. In short, one who is motivated is the opposite of lazy. This colloquial meaning of the word motivation has particularly important implications for attempts to understand the epidemic of unhealthy behavior. If we use the colloquial meaning of motivation, then saying that the epidemic of unhealthy behavior is a function of human motivation seems like blaming people for their actions. It is like saying that people engage in unhealthy behaviors because they lack will-power or are just too lazy to do what is healthier.

For example, someone who is attempting to lose weight may be said to choose the chocolate cake instead of the fruit salad because he or she lacks the willpower or is too lazy to avoid tasty but unhealthy foods. Likewise, someone who is trying to start a program of regular exercise but instead decides to skip his or her exercise session may be thought of as too lazy to put forth the effort to exercise.

In these colloquial terms, a lack of motivation represents a weakness in character. It is no giant leap to conclude that if people lack the motivation (defined in this way) to avoid unhealthy foods, exercise regularly, engage in safe sexual practices, or quit smoking, drinking, or using drugs, then it is their own fault and they deserve the poor health that may come as a consequence of their actions.

This concern about coming off as blaming people for having the character flaw of being unmotivated is, perhaps, one of the major reasons why

health behavior scientists have thus far failed to emphasize motivation as a key determinant of unhealthy behavior. When motivation is defined as a stable character trait then it is much nicer to consider unhealthy behavior as a function of lack of education or poor access to healthier behavioral options instead of being due to low motivation. By this reasoning, people eat unhealthy foods because such foods are constantly available to them and healthier foods are expensive and difficult to access; people avoid exercise because of the time demands of earning a living in today's economy; people engage in unsafe sexual practices because they do not know about the risks or do not have access to contraception; people smoke, drink, or use drugs because they are in the uncontrollable grip of addiction to these widely available substances. When thinking of unhealthy behavior in this way, rather than as a function of low motivation, it is easier to absolve the individual of any blame, because behavior is a function of forces that are outside of one's personal control.

To be sure, there is considerable merit in emphasizing environmental constraints on behavior. For one thing, there are some contexts in which unhealthy behaviors *are* outside of an individual's personal control. These instances involve lack of knowledge, lack of access, and lack of freedom of decision. For example, unfortunately there are still many people in the world who lack education regarding risky sexual practices and their association with sexually transmitted diseases. Likewise, many people simply do not have access to vaccinations, and so there is no decision to be made about whether or not to have their children vaccinated. As a final example (and there are plenty more), some women in strongly patriarchal cultures have no freedom to make decisions about sexual practices. Such instances of lack of knowledge, access, and/or freedom of decision are, unfortunately, relevant for a considerable proportion of the world's population, and thus providing education, access, and freedom of choice to all people is vital and must be a public health priority.

However, large portions of the world's population – likely the majority – do have at least some knowledge, access, and freedom to choose their health-related behaviors. Moreover, even among those individuals for whom access to certain behaviors is limited (e.g., vaccinations), other behaviors are available (e.g., healthier food choices). Thus, lack of knowledge and environmental constraints is only part of the story. The part of the story that is missing is the acknowledgment that unhealthy behaviors, such as eating tasty but calorie-dense foods, avoiding aversive exercise, engaging in promiscuous sex, and smoking, drinking, and using drugs, are, for most people, also largely a function of human motivation.

But, and this is the critical point, when I speak of motivation here, I am not referring to a stable character trait that represents strong willpower or lack of laziness. Instead, I am referring to hedonic motivation – a dynamic psychobiological phenomenon that occurs at the time of the behavioral opportunity (a concept that will be the focus of this book). The latter definition of motivation is value free. If someone is hedonically motivated to eat unhealthy foods or is hedonically motivated to avoid exercise, it is not because they are lacking in character. Instead, hedonic motivation is a function of the person's previous pleasures and displeasures in immediate response to the behavior, as well as the presence of relevant triggering stimuli and biological states. A person's hedonic motivation to eat the chocolate cake instead of the fruit salad is a function of the previous pleasure of eating chocolate cake, the environmental stimuli that have become associated with such previous pleasures, and the person's present level of hunger. The same goes for a person's hedonic motivation, or lack thereof, to exercise.

While hedonic motivation to engage in unhealthy behavior is not a cause of unhealthy behavior among people who completely lack knowledge, access, and freedom to choose, it is a fundamental cause of unhealthy behavior among those who have even some minimal level of knowledge, access, and freedom to choose. For example, the hedonic desire to smoke is a fundamental cause of smoking even for the person whose habit is maintained by constant stressors and addiction to nicotine. The hedonic motivation to eat fast food is a fundamental cause of eating fast food even for the person who has limited access to affordable healthier foods and limited time to prepare such foods. The hedonic dread of exercise is a fundamental cause of consistent avoidance of exercise even for the single parent who must hold down two jobs to care for his or her three young children.

Hedonic motivation is defined by our automatically triggered desires and dreads, not by the reasonableness or nobility of those desires and dreads. From a scientific perspective we must work to understand the hedonic motivations for unhealthy behaviors, not judge them as morally right or wrong.

It is this scientific view of motivation as automatically triggered hedonic motivation based on previous experiences and situational contexts, rather than the colloquial view of motivation as "the opposite of lazy," that is the focus of this book.