

How to Exert Free Will

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Introduction

In this book I tell you how to exert free will; but before I do that, in true philosophical fashion I must say what it is and discuss some arguments regarding whether we have it or not.

The big questions of philosophy, from antiquity to the present, are three: What is real? How do we know what's real? And what shall we do about it? A philosophy for real life treats these not as interesting academic puzzles—although certainly they are that as well—but as questions of profound relevance to the effort to decide how to live our lives, that is, to ethics.

If the concern about ethics is to have any meaning, we must assume that we have free will, that we are free to choose one course of action over another or to cultivate one type of character over another. But modern science has seemingly reduced everything to a causally determined physical matrix in which the present is nothing but an inevitable outcome of the past. This book is about how to reconcile the intuition that we are free to choose with what we know from scientific inquiry.

The first thing to note, and a topic to which I return below, is that scientific discovery no longer supports a wholly deterministic view of the universe. Ever since the 18th century we have thought the world to be fundamentally physical and causally determined, a Newtonian mechanistic universe in which inert matter is all there is and every change is determined, much like the movement of billiard balls. That view has now been superseded by quantum mechanics, which reveals that at the tiniest, most fundamental level of physical reality things and events are indeterminate. At that level the outcomes of events cannot be predicted in advance except in statistical terms. Quantum indeterminacy is in play in the neurons of our brains, and hence in our thinking, choosing and acting. Although quantum physics does not prove we have free will, it allows the possibility.

Where people get confused is at the larger level of everyday events. At that level physical causality does apply reliably and the world *is* rather like a billiard table. We can predict quite accurately how much weight a bridge can hold and how much tension it will take to snap a cable. We act as if we are free of such constraints when we decide what to do, but we wonder if that freedom is an illusion.

It's not; and this little book explains why.

A Ridiculous Question

A bogglingly large number of books have been written on the topic of free will, and I hope I'll be forgiven for bringing it up yet again, for in a sense it is a ridiculous question. The most cogent statement I have found on the topic is this:

*We need not enter into a philosophical debate between free will and determinism in order to decide how to act. Either we have free will or it is determined that we behave as if we do. In either case we make choices.*¹

The point of a philosophy for real life is to figure out how to make those choices, not whether we have the ability to do so. For purposes of deciding what to do in any given situation or what kinds of habits of character to form, wondering whether we are in fact free to do so is a waste of time. If you believe you have free will, how would your life be different if you became convinced that you don't? If you believe all is determined and you do not have free will, how would your life be different if you were convinced that you do? The fact is, we all act as if we have free will, regardless of what we say we believe about it.

In another sense, however, it is not ridiculous. In a recent psychology experiment subjects were found to be more prone to cheating after having been exposed to arguments denying that we have free will than was a control group not so exposed.² Neuroscientists debate how findings that much of our behavior is determined should affect judicial concepts of blame, responsibility and punishment: if we can't help what we do, we don't deserve blame, so what role should punishment play? (The answer is to go for rehabilitation to modify future behavior instead of punishing past behavior.)³ Whether or not we believe we have free will does have consequences; hence, we need to try to resolve the issue.

The debate about free will is whether we have it and how it works if we do. It is a conundrum because we appear to live in a deterministic universe. Ever since antiquity or earlier, people have noticed that some aspects of their world recur with great regularity. Apply fire to something, and it invariably gets hotter. The sun always rises in the east and sets in the west. Through the application of the scientific method of discovery we have found laws of nature that consistently operate in the same way, so much so that we say that physical nature is determined by those laws. By "determined," we mean that given a configuration of physical elements and the invariant laws of nature, we can confidently predict precisely what will happen next. The argument against free will says that if all of nature is determined, and if we are part of nature, then we are determined. We think we have the ability to choose freely what we do, but that ability is an illusion.⁴

¹ Fisher and Ury, *Getting To Yes*, p. 53

² Tierney, "Do You Have Free Will? Yes, It's the Only Choice."

³ Greene and Cohen, "For the law, neuroscience changes nothing and everything."

⁴ Historically determinism has also been associated with the idea of a supernaturally powerful God who makes things happen. I address this aspect of the problem in an appendix below.

To assess this argument we first need definitions of the concepts of determinism and free will.

Definitions

The definition of determinism is easy. *Determinism*, according to philosopher Daniel Dennett, quoting Peter Van Inwagen, “is the thesis that ‘there is at any instant exactly one physically possible future.’”⁵ On this view, events succeed each other according to rigid, predetermined laws; and if we knew enough about the facts of the universe at any given time and the laws of nature, we would know with certainty what would happen next.

The definition of free will is a little more complex. First let’s take “will.” Philosopher Robert Kane, who has made a career of studying the issue, lists three meanings of the term.⁶

- What we want, desire or prefer to do. This is called *appetitive* will, because it has to do with our appetites.
- What we choose, decide or intend to do. This is called *rational* will, because it has to do with reasoning and deciding.
- What we try, endeavor or make an effort to do. This is called *striving* will.

All three are teleological, oriented to an end or purpose (*telos* in Greek). In using our will we desire, intend or try to make something happen that is not happening yet, or to make something that is already happening continue to happen. They are all oriented to the future. Clearly we human beings have will in all three senses.

(Parenthetically we might ask whether animals have will. Certainly even the most primitive animals seem to have desires and to make efforts to approach or avoid things in their environment. Whether they have any rationality depends on how complex they are. It is hard to imagine a single-celled amoeba envisioning possible courses of action and choosing among them. It is not so hard to imagine an elephant or an ape or a whale doing so. I suspect that, like most of reality, the ability to think and choose ranges on a continuum from minimal to maximal. Humans are on the maximal end of the scale.)

The question is whether the will we have is free.

In ordinary parlance, of course it is. According to philosopher Patricia Churchland, the ordinary meaning of the term “free will” is this:

If you are intending your action, knowing what you are doing, and are of sound mind, and if the decision is not coerced (no gun is pointed at your head), then you are exhibiting free will. This is about as good as it gets. Moreover, that is generally good enough for practical purposes. We are all familiar with the prototypes of voluntary, uncoerced, intended actions, and we regularly use the

⁵ Dennett, *Freedom Evolves*, p. 25.

⁶ Kane, *The Significance of Free Will*, pp. 26-27.

*categories intentional and voluntary to draw meaningful distinctions, both in everyday life and in the courtroom.*⁷

This is the sense in which the question is ridiculous. We all act as if our will is free in this sense. But this essay addresses something deeper. For philosophical purposes I adopt Kane's definition of free will:

*Free will ... is the power of agents to be the ultimate creators (or originators) and sustainers of their own ends or purposes. ... To will freely ... is to be the ultimate creator (prime mover, so to speak) of your own purposes.*⁸

Will has to do with wanting, choosing and striving to attain ends or purposes. We humans are very good at achieving goals, at accomplishing our ends and purposes. But who or what gets to set the goals? To say that our will is free is to say that at least in some cases we ourselves, not something other than or external to us, choose what ends or purposes we strive for.

We can list the philosophical positions regarding free will by combining assertions about determinism and about free will. Let's represent the proposition that the world is entirely determined as *D* and the proposition that it is possible to have free will as *F*. To make sure we have all our bases covered we can put them together systematically and label each combination. Then we can decide which combination most accurately describes reality. Here are the combinations:⁹

D true	F true	Compatibilism
D true	F false	Hard Determinism
D false	F true	Libertarianism (a philosophical, not a political, term)
D false	F false	Hard Incompatibilism

We can immediately rule out the first two. It is not the case that all of nature is determined. Quantum physics has demonstrated as well as anything can be demonstrated in science that at the tiniest level of reality events are indeterminate. By this I mean that the outcomes of events cannot be predicted in advance, except in statistical terms. An initial configuration of things and forces does not determine a specific subsequent configuration. Instead it has the possibility of evolving into more than one configuration. In the world that we experience, only one of those possible configurations will actually be observed to happen, and we cannot predict in advance which one it will be. Mathematics can describe the probability of a range of outcomes, but cannot predict a single outcome. The thesis that there is at any instant exactly one physically possible future is simply false.

Determinists object that quantum indeterminacy makes no difference at the level of reality in which we all live, the world in which, if we know all the physical facts such as force, mass, acceleration and resistance, we can quite confidently predict where the

⁷ Churchland, *Touching a Nerve*, pp. 180-181.

⁸ Kane, *The Significance of Free Will*, p. 4.

⁹ Wikipedia, "Free will."

billiard ball will land. Quantum indeterminacy is “collapsed” and resolved at that level, and deterministic physical law is all that matters.

But that’s not true. Quantum indeterminacy does have an effect in the world of everyday life because it operates inside our brains.

Brains, Choices and Free Will

The story of what quantum indeterminacy is and how it operates in our brains is complex, and I treat it in more detail in my book, *How To Be An Excellent Human*,¹⁰ and in an essay freely available on the internet.¹¹ Here is a summary.

The brain does its work by means of transmitting electrochemical impulses through neurons. A neuron receives many incoming impulses from other neurons and sends out impulses to many other neurons. Some of the incoming impulses are excitatory, tending to make the neuron “fire,” or send out an impulse; some of them are inhibitory, tending to make the neuron fail to fire. (A neuron either fires or it does not; there is no in-between state.) When a neuron fires, neurotransmitter chemicals travel from one neuron to another across the synapse between them. What causes the neurotransmitters to be released into the synapse is the entry of calcium ions into nerve terminals. If enough calcium ions hit their receptor sites within a nerve terminal, the terminal releases the neurotransmitters; otherwise it doesn't.

Here is the important part: Calcium ions and the channels through which they travel are small enough that quantum indeterminacy is in play. Calcium ions might or might not hit their triggering sites; hence, a given neurotransmitter might or might not be released; hence the receiving neuron might or might not get excited (or inhibited).

In other words, at the most fundamental level, brain functioning is not causally determined.

Since brain functioning is the physical aspect of how we perceive, move, react and make decisions, this means that our decisions and actions are not fully determined by what has happened in the past.

So if we are not fully determined, then we have free will, right? Well, maybe not. There are some objections from those who say that even in an indeterministic world we still have no free will. (This is Hard Incompatibilism in the matrix above.)

The most common objection is that if our actions are caused by randomness then we are just as unfree as if they were caused by determinism. Psychologists Joshua Green and Jonathan Cohen say,

*The sort of indeterminism afforded by modern physics is not the sort the libertarian needs or desires. If it turns out that your [actions are] completely determined by the laws of physics, the state of the universe ... and the outcomes of myriad subatomic coin flips, your [action] is no more freely chosen than before. Indeed, it is randomly chosen, which is no help to the libertarian.*¹²

¹⁰ Meacham, *How To Be An Excellent Human*, pp. 37-49.

¹¹ Meacham, “The Quantum Level of Reality”.

¹² Greene and Cohen, p. 1777.

My response is this: what matters is not the outcome of a single quantum event, but the overall pattern of many of them. What appears to be random when you look only at individual events reveals patterns when you look at them in aggregate. Micro-units of quantum indeterminacy cohere into larger arrangements that are not random. We can see this on the physical level in the interference pattern, the stripes of lightness and darkness, in the double-slit experiment (see Appendix B, The Double-Slit Experiment). When we consider human action and will, we find patterns as well, patterns that are best described in *agential* terms. The patterns of beliefs, desires, aversions and intentions that we ascribe to ourselves and others are at a higher level than the individual neural events which underlie them, and obey different laws.

Patterns of calcium-ion events within a nerve terminal are inputs to patterns of nerve terminals releasing neurotransmitters, which are in turn inputs to the firing of adjacent neurons. Activities of individual neurons are, as Ray Kurzweil has described, inputs to yet higher-level assemblies of pattern recognizers composed of multiple neurons.¹³ The nesting of patterns within patterns continues up to higher and higher levels of complexity, at the apex of which we recognize ourselves and others as agents motivated by beliefs, desires, intentions and plans. Thus, the actions of agents—that is to say, our own actions—are not fully determined by what happened in the past.

But does quantum indeterminacy really propagate upwards to observable behavior? Some claim that this account of neural functioning is misleading:

Given the high concentration of calcium ions in the terminal, it's extremely likely that the net effect is zero. For every ion pushed away by a quantum event, another is pushed toward. If this were not the case, we would be dying of heart attacks before reaching puberty, since neurons that drive the heart muscle must be subject to the same quantum effects.

It's an example of biological fault tolerance. Critical systems like neurons—cells in general—are resilient to error through physical redundancy (multiple vesicles, multiple binding sites per vesicle, multiple calcium channels, thousands of available calcium ions per neuron).¹⁴

Good point. If quantum uncertainty underlies all brain functioning, why does most of that functioning happen in foreseeable, regular ways? Why do some patterns of neural firings—those that govern our heartbeat, for instance—happen quite predictably, while others, such as those that correspond to our making a free choice, do not?

There is a saying in brain science, “cells that fire together wire together.” When the firing of neuron A is, repeatedly and persistently, input to neuron B’s firing as well, a metabolic change takes place such that neuron A becomes more likely to be effective in causing B to fire.¹⁵ The brain, composed of living cells, changes (a process called *brain plasticity*)¹⁶ to make the repeated pattern more likely. In such a case the

¹³ Kurzweil, Ray, *How To Create a Mind*, p. 80.

¹⁴ Bjerke, Gary, “A Response To ‘Beyond the Causal Veil.’”

¹⁵ Kurzweil, Ray, *How To Create a Mind*, pp. 79-80.

¹⁶ Chudler, Eric H. “Brain Plasticity: What Is It?”

probabilities involved in neural firing are adjusted to make it extremely likely that the regularity will persist. That's how come our heartbeat is not interrupted by quantum fluctuations.

But this does not happen in cases of free choice because there are conflicting patterns of cells firing together. Here is a common example, often posed in discussions of ethics: suppose you are hurrying to a very important meeting with a client and your boss, a meeting that will have a big impact on your career. You pass a person lying by the road injured and bleeding. You want to be compassionate and stop and help the bleeding person, but you also want to be on time for your meeting. In such a case your goals, ends and purposes are in conflict. There is no routine pattern of neural firing that is so highly probable as to be determined and certain.

In this case, where there is no future outcome that is far more highly probable than any other, the effect of the quantum indeterminacy at the lowest level is magnified rather than damped out. When you must make a choice, the choice is not determined in advance. Nor is it merely random. Conflicting emotions and thought process go through your mind. You have good reasons for stopping to help, and you have good reasons for hurrying to your appointment. You have to choose, and it is not just a matter of flipping a coin.

Kane lists three criteria by which we recognize that a choice is made freely, on our own:¹⁷

- We have good reasons for our choice.
- We choose as we do for those reasons.
- In choosing we define ourselves as a being who wants to act for those reasons more than for any others.

These three conditions are satisfied *in either case*, whether you stop to help or hurry on. Whichever choice you make, afterwards you can legitimately say that you, not your brain cells, made the choice, because you had good reasons for your choice and you acted for those reasons. And that is true even though you did not know and could not possibly know ahead of time which choice you would make.

That's how free will works in an indeterministic universe, not by magically flouting physical laws, but by conforming to them.

Oddly, even those who think the universe is fully determined come to much the same conclusion. Case in point: Daniel Dennett.

¹⁷ Kane, *The Significance of Free Will*, p. 137.

Freedom and the Game of Life

No discussion of free will would be complete without mention of Daniel Dennett, a noted compatibilist, one who believes that free will is a reality even though the universe is wholly determined. Leaving aside the fact that the universe is not in fact wholly determined—because quantum indeterminacy is in effect at the subatomic level of reality—his account of free will is instructive, as it analyzes the practical effects of free will, effects that are real regardless of whether the universe is wholly determined or not.

Dennett writes in the tradition of Wittgenstein, who thought that the purpose of philosophy is to break bad habits of thought, which are typically brought about by the bewitchment of intelligence by language.¹⁸ Dennett's work on the topic is all about deflating exaggerated misconceptions of what free will really is. What do we really mean when we say we want our will to be free? His answer is that we cannot, upon rational reflection, mean that we want it to be uncaused.¹⁹ Instead we want the following.²⁰

- We want our actions to be determined by good reasons, not by causes outside our control.
- We want to control our own decisions and actions, not be controlled by someone or something else.
- We want to be free from constraint.
- We want our deliberations to be effective, to have a genuine ability to influence the course of affairs.
- We want dignity and responsibility to be real, not illusory. And we want fatalism and nihilism to be illusory, not real.

All of these depend crucially on the notion of *agency*, that we are “capable of initiating, and taking responsibility for, projects and deeds.”²¹ Dennett calls this view of human nature the “agency metaphor.”²²

Agency

In other works he uses a technical term in philosophy, the “intentional stance,” to refer to ascriptions of agency. Dennett observes that we ascribe to others an interiority (my word, not his) much like our own; we all make use of what psychologists call Theory

¹⁸ Dennett, *Elbow Room*, p. 18.

¹⁹ Dennett, *Freedom Evolves*, p. 13.

²⁰ These points are the topics of the various chapters of Dennett, *Elbow Room*.

²¹ Dennett, *Elbow Room*, p. 169.

²² Dennett, *Elbow Room*, p. 61.

of Mind. The term “Theory of Mind” refers to the ability to attribute mental states—beliefs, intentions, desires, pretense, knowledge, etc.—to ourselves and others and to understand that others have beliefs, desires and intentions that are different from our own.²³ What psychologists call Theory of Mind, Dennett calls the *Intentional Stance*:

*[The intentional stance] consists of treating the object whose behavior you want to predict as a rational agent with beliefs and desires and other mental states exhibiting what Brentano and others call intentionality.*²⁴

“Intentionality” is a technical term meaning, roughly, “aboutness.”²⁵ It does not mean what it normally does outside of philosophy, to do something deliberately or on purpose. In philosophy it means that when we are conscious, we are conscious *of* something, and that when we make statements or have beliefs, they are *about* something other than the statements or beliefs themselves. Since “intentional” has a perfectly good everyday usage, it is unfortunate that Dennett uses it to describe the stance we generally take toward other people, toward many animals and, figuratively at least, toward some non-living things such as computers. I prefer to call it an *agential stance*: we interpret others as agents. Dennett himself notes that he could have called it the “rational agent” stance.²⁶

Dennett writes in the context of philosophical debates about what sorts of things beliefs are. Are they real states of a person’s mind, ultimately describable in terms of states of the person’s brain? Are they merely interpretations we make of a person’s behavior or speech? Dennett does not want to talk about states of mind that are perceivable only introspectively, not (I think) because he believes they don’t exist, but because he believes we can’t get any useful knowledge out of such talk. But he does want to say that beliefs and desires and the like really do exist in some sense out there in the world. They are reasonable explanations of observable phenomena which are usefully described as the actions and behaviors of agents.

In other words, his intentional stance is a way of describing reality that has predictive power in certain circumstances. Other ways of describing reality are the *physical stance*, in which we use our knowledge of the laws of physics (i.e., the discerned regularities of how physical things interact) to describe and predict events, and the *design stance*, in which we predict that a system will behave as it is designed to behave, ignoring the details of how that design is implemented and who or what designed it.²⁷ The intentional stance is objective, revealing “patterns in human behavior that are describable from the intentional stance, and only from that stance,

²³ Wikipedia, “Theory of mind.” Dennett is known to dislike the term because in everyday life we do not actually make use of psychological theories such as behaviorism, cognitivism and the like. Our use of the intentional stance is more like a talent or competence than an explicit theory. See Dennett, *Intuition Pumps*, p. 73.

²⁴ Dennett, *The Intentional Stance*, p. 15.

²⁵ Dennett, *The Intentional Stance*, p. 240.

²⁶ Dennett, *Intuition Pumps*, p. 78, footnote.

²⁷ Dennett, *The Intentional Stance*, pp. 16-17.

and that support generalizations and predictions.”²⁸ From that stance, beliefs and desires are quite as real as physical objects:

*There are patterns in human affairs that impose themselves, not quite inexorably but with great vigor, absorbing physical perturbations and variations that might as well be considered random; these are the patterns we characterize in terms of the beliefs, desires and intentions [in the everyday sense] of rational agents.*²⁹

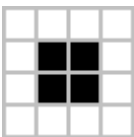
How Agency Evolved

Dennett, being a materialist, has quite an elaborate account of how agency, with its concomitant notions of freedom and responsibility, has emerged through evolution from arrangements of lower-level physical elements. In his model of reality everything is determined at the lowest level, but higher-level agential patterns emerge from the interactions of low-level elements.

He reasons by analogy from the Game Of Life, a simple computer algorithm invented by mathematician John Conway.³⁰ The universe of the Game of Life is a two-dimensional grid of square cells, each of which is in one of two possible states, alive or dead. Every cell interacts with its eight neighbors, the cells that are horizontally, vertically, or diagonally adjacent. At each step in time, the following transitions occur:

- Any live cell with fewer than two live neighbors dies, as if caused by under-population.
- Any live cell with two or three live neighbors lives on to the next generation.
- Any live cell with more than three live neighbors dies, as if by overcrowding.
- Any dead cell with exactly three live neighbors becomes a live cell, as if by reproduction.

The initial pattern constitutes the seed of the system. The first generation is created by applying the rules simultaneously to every cell in the seed. Births and deaths occur simultaneously at each tick of the programmed clock (in other words, each generation is a pure function of the preceding one). The rules continue to be applied repeatedly to create further generations. Here are two simple seeds:

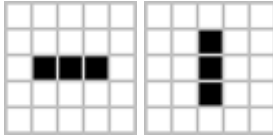


²⁸ Dennett, *The Intentional Stance*, p. 25.

²⁹ Dennett, *The Intentional Stance*, p. 27.

³⁰ Wikipedia, “Conway’s Game of Life.” You can find several implementations of the game on the internet, should you wish to try it out yourself, for instance at <http://www.kongregate.com/games/shaman4d/conways-game-of-life> as of 26 October 2014.

Block, a still life.



Blinker, which oscillates between two patterns.

Given an initial configuration of elements, the rules determine unambiguously and invariably what happens at each iteration. At the lowest level, considered from the physical stance, everything is completely determined. But we, like gods from the imagined point of view of the world of the game, can change the initial configuration. As we do so, unexpected patterns emerge. We find gliders, configurations that move in a straight line through the two-dimensional space. We find eaters, configurations that destroy gliders that collide with them. We find puffer trains, space rakes and other oddly-named configurations.³¹ When we detect such entities (and they are easy to see), we have adopted the design stance, interpreting what we see as a higher-level pattern that operates according to its own law (i.e., in its own regular way), even though all the patterns are governed by the same fundamental laws.

In a similar way, Dennett says, all the complexity that we know as agential has emerged via evolution from simpler physical forms. The blind trial-and-error of Darwinian selection creates organisms capable of learning and adopting better and better strategies for survival and reproduction.³² And those strategies depend crucially on belief and desire, which are properties of agents.

According to Dennett, evolution of replicators by natural selection, combined with the usefulness of the agential stance to predict and explain behavior, is enough to account for what we know as freedom of will.

Philosophical Implications

Is Dennett right? He certainly makes a good case that all the concerns about free will listed at the beginning of this chapter can be explained (or explained away) by evolution, but the details are too many to summarize here. Instead I consider just a couple of points.

The first is self-awareness. The real power of human agency, says Dennett, is our capacity for what I call second-order thinking, the power to take ourselves as objects of observation and thought. He observes that evolution has provided us with *practical reason*, the ability to anticipate events and to take actions to enhance our chances for survival. Practical reason is the result of development of an ever more elaborate ability to recognize patterns, and that ability culminates in second-order thought:

³¹ Dennett, *Freedom Evolves*, p. 39.

³² Dennett, *Elbow Room*, p. 30.

*The truly explosive advance [in our ability to go beyond unthinking reflex] comes when the capacity for pattern recognition is turned upon itself. The creature who is not only sensitive to patterns in its environment, but also to patterns in its own reactions to patterns in its environment has taken a major step.*³³

I have asserted elsewhere³⁴ that our capacity for second-order thinking is the peculiarly human virtue, that which distinguishes us from other animals and the exercise of which can lead to a fulfilling life. Dennett seems to agree and says that this capacity is the result of many thousands of years of evolution, a point with which I have no dispute.

Another interesting aspect of Dennett's treatment of the issue of free will is how much his thinking is like that of American Pragmatists C.S. Peirce and, in particular, William James. James asks, "Grant an idea or belief to be true ... what concrete difference will its being true make in anyone's actual life? How will the truth be realized? What experiences will be different from those which would obtain if the belief were false?"³⁵ And "the possession of true thoughts means everywhere the possession of invaluable instruments of action."³⁶ This method of assessing truth is reflected in passages such as these by Dennett:

*The answer [to whether someone could have done otherwise in exactly the same circumstances and internal state] could not conceivably make any noticeable difference to the way the world went.*³⁷

*The useful notion of "can," the notion that is relied upon not only in personal planning and deliberation, but also in science, is a concept of possibility.*³⁸

*The main thing [in considering whether one could have done otherwise] is to see to it that I jolly well will do otherwise in similar situations in the future.*³⁹

*... what philosophy is for.*⁴⁰

These passages all show quite a practical attitude toward philosophical questions and indeed toward philosophy itself. Instead of puzzling over abstract concepts, we look at what difference various answers would make in our dealings with the world. In this approach the pragmatists bear some resemblance to Wittgenstein. Both offer philosophical methods to clean up confusion.

Let's take this attitude toward Dennett's fundamental assertion, that all the things we ascribe to agency and to free will can be accounted for in a deterministic universe by

³³ Dennett, *Elbow Room*, p. 29.

³⁴ Meacham, "The Human Virtue" and *How To Be An Excellent Human*, pp. 129-133.

³⁵ James, "Pragmatism's Conception of Truth," p. 133.

³⁶ James, "Pragmatism's Conception of Truth," p. 135.

³⁷ Dennett, *Elbow Room*, p. 138.

³⁸ Dennett, *Elbow Room*, p. 148, emphasis added.

³⁹ Dennett, *Elbow Room*, p. 143.

⁴⁰ Dennett, *Elbow Room*, p. 18, emphasis in original.

the aggregation of lower-level patterns into higher. Compare it to the assertion that I make above, that in an indeterministic universe what matters is not the outcome of a single quantum event, but the overall pattern of many of them. The assertions are basically identical: what matters is agency, which is usefully described and explained at a higher level than fundamental physical units, be they deterministic or not. Hence, whether the universe is deterministic or not doesn't make any difference to the question!

(Of course, we have very good reasons from physics for believing in quantum indeterminacy. Dennett argues by appeal to analogy and intuition in *Freedom Evolves* that we do not need to postulate any quantum indeterminate effects on our thinking and decision making in order to have free will.⁴¹ His argument, fascinating as it is, is irrelevant. Such effects do exist, so we might as well take them into account.)

We are again back at our original thought, that the question of free will is ridiculous. As Dennett says, "We cannot help acting under the idea of freedom, it seems; we are stuck deliberating as if our futures were open."⁴²

But Dennett also notes that it is quite crucial to recognize that our will is in fact free, because we will be much worse off if we think it is not:

*Believing that one has free will is itself one of the necessary conditions for having free will: an agent who enjoyed the other necessary conditions for free will—rationality and the capacity for higher-order self-control and self-reflection—but who had been hoodwinked into believing he lacked free will would be almost as incapacitated for free, responsible choice by that belief as by the lack of any of the other necessary conditions. ... If [a person] sinks into doubt, or worse, into the conviction that he lacks free will, he is certain to be right: his attitude toward his own opportunities for choice and action will be such that he is essentially disabled as a chooser.*⁴³

In our own game of life—the one in which each of us is the star player—it makes a lot more sense to assume that our will is free than not.

⁴¹ Dennett, *Freedom Evolves*, pp. 97-139.

⁴² Dennett, *Elbow Room*, p. 108.

⁴³ Dennett, *Elbow Room*, p. 168.

Agent Causation

When we consider our will, we find patterns that are best described in agential terms. It makes more sense and gives us more predictive power to think of ourselves and other people as motivated to act by reasons than as impelled to act by causes. But of course when we act we initiate chains of events in the world that are best described in causal terms. In other words, as agents we are causes. The name for this state of affairs is “agent causation.”

Agent causation is the idea that “agents can start new causal chains that are not pre-determined by the events of the immediate or distant past and the physical laws of nature.”⁴⁴ Another formulation is this: “Some events are caused, not by other events, but by ... intentional agents.”⁴⁵ Yet another is this: “An action or event is caused by an exertion of power by some agent with will and understanding.”⁴⁶

“Agent” here has the usual meaning: something, in this case a person, that acts or has the power to act. The term does not necessarily denote a non-physical entity such as a soul, although it may. I use it to refer to a person taken as a whole, not an entity somehow above and beyond the sum total of one’s beliefs, desires, dispositions, memories and so forth. The strong form of agent causation says that an agent can initiate a chain of events without any prior cause. A more reasonable form says that an agent can initiate a chain of events without being completely determined by prior causes, recognizing that things generally have more than one cause.

The theory of agent causation is not that what agents do is uncaused. It is that (1) what causes agents to do things is different from what causes physical objects to do things, and that (2) even so, an agent’s actions cannot be fully predicted. There are ways we try to influence people, but we can only influence, we cannot completely control another person. We can never be sure what somebody will do until they do it. Nor can we be sure what we ourselves will do until we do it. And afterwards we recognize that we could have chosen differently. (In this sense agents are a bit like quantum-level subatomic particles.)

This notion is philosophically controversial because it makes agency a different category of causation from ordinary physical causation. It says that there is something about a human being that is more than just physical, chemical and biological reactions. Even if we knew the entire physical history and current state of a person (unlikely as that would be), we could not predict that person’s actions with 100% accuracy. A person is creative, able respond to events in a new way. In any situation the person has the ability to choose, and that choice is itself a determining factor in future events, a factor that is not entirely due to preceding physical events.

Such a notion is a problem only if we forget why we are interested in causality in the first place. We want to know what causes events because we want to predict and

⁴⁴ The Information Philosopher, “Agent-Causality.”

⁴⁵ von Wachter, “Agent Causation”.

⁴⁶ Cambridge Dictionary of Philosophy, p. 15.

control them. Physics is, in a sense, the art of telling the future. By understanding what makes things happen, we can design machines to accomplish our goals. We can predict with some confidence that the bridge will carry the intended weight, that the airplane will fly its intended distance at its intended altitude, that the structure will stand in the face of winds of a certain force, etc.

The situation is the same with human beings, but the causes of human behavior are different from what causes the behavior of nonliving things. We are motivated by our beliefs and desires. If we want to predict what a person will do, we consider what they believe to be true and what they want. If we want to influence that person's behavior, especially if we want their willing cooperation, we influence their beliefs and desires. We can control their behavior by brute physical force of course—by locking them up, say—because people are physical beings; but far more often we use non-coercive measures such as convincing them of certain facts—influencing their beliefs—or changing their desires through enticement, persuasion, cajoling, bribery, offers of exchange, reward or punishment, and many other methods that would have no effect at all on nonliving substances. In other words, we act all the time as if people are free agents with the capacity to choose what they do.

We do this for two reasons: because our minds are built this way, and because it works.

Capacities of Mind

The second most cogent statement I have ever found on free will is this, from cognitive psychologist Steven Pinker:

*A human being is simultaneously a machine and a sentient free agent, depending on the purpose of the discussion, just as he is also a taxpayer, an insurance salesman, a dental patient, and two hundred pounds of ballast on a commuter airplane, depending on the purpose of the discussion.*⁴⁷

Cognitive scientists have identified specific sets of mental modules—similar in function to software modules—that operate in different areas. We have a set of methods to deal with physical objects and another set to deal with agents, and the two are not the same.

Research with very young infants⁴⁸ reveals that people have innate ideas—ideas formed in advance of experience and through which experience is interpreted—about how the physical world works: that an object cannot pass through another object, that objects move along continuous trajectories, that objects are cohesive (their parts move together), that they move each other by contact only, and so forth.⁴⁹

We also have innate ideas about agents, says Pinker.

*Agents are recognized by their ability to violate intuitive physics by starting, stopping, swerving, or speeding up without an external nudge, especially when they persistently approach or avoid some other object. The agents are thought to have an internal and renewable source of energy ... which they use to propel themselves, usually in service of a goal.*⁵⁰

This cognitive domain is adapted to understanding and dealing with animals, including humans. Human agents have minds, and we interpret people's behavior in terms of beliefs and desires.

Agent causation, in other words, is built into the machinery of our minds, presumably for very good evolutionary reasons: our ancestors who thought this way had more offspring than their contemporaries who didn't.

⁴⁷ Pinker, *How the Mind Works*, p. 56.

⁴⁸ The methodology is fascinating. Babies can't talk, but they exhibit interest and boredom by looking at something intently or by looking away. Researchers set up a screen that hides part of the baby's visual field and allows the baby to see things on either side, such as something sticking out from the left and something sticking out from the right. "It's especially informative when a screen first blocks part of the infant's view and then falls away, for we can try to tell what the babies were thinking about the invisible part of their world. If the baby's eyes are only momentarily attracted and then wander off, we can infer that the scene was in the baby's mind's eye all along. If the baby stares longer, we can infer that the scene came as a surprise." (Pinker, *How the Mind Works*, p. 317.)

⁴⁹ Pinker, *How the Mind Works*, pp. 318-319.

⁵⁰ Pinker, *How the Mind Works*, p. 322.

Interestingly, it may well be that the sense of agent causality is more primordial than that of physical causality. Scholar Robert Wright observes,

Our brain's capacity to think about causality—to ask why something happened and come up with theories that help us predict what will happen in the future—evolved in a specific context: other brains. When our distant ancestors first asked “Why,” they weren’t asking about the behavior of water or weather or illness; they were asking about the behavior of their peers. ... To answer a “why” question—such as “Why did the thunderstorm come just as that baby was being born?”—with anything other than a humanlike creature would have been kind of strange.⁵¹

⁵¹ Wright, *The Evolution of God*, pp. 468-470.

A Digression: Truth and Metaphysics

We have two ways of knowing, physical and agential, both built into our perceptual apparatus.⁵² Which one is true? The answer is: both. Both provide useful and accurate ways of understanding, predicting and controlling aspects of reality. They each have their area of application, and humans have used them successfully for hundreds of thousands of years. By the criteria that I outline in more detail elsewhere,⁵³ each way of knowing has the following traits:

- It fits the facts of our experience.
- It is internally consistent and is simpler than competing theories.
- It is coherent with everything else we know.
- And it gives us mastery over the realm of experience to which it applies, better than competing theories.

We are quite justified in treating ourselves and other people as agents with free will, the ability to choose without being fully determined by the past, because by these criteria that view works well enough to be considered true.

You might question the bit about “coherent with everything else we know.” Agents seem quite different from physical objects. How can both be included in a comprehensive account of everything? One answer is to take agents as a fundamental ontological category, along with and equal in importance to physical objects.⁵⁴ That is rather a dualistic metaphysics however, strongly reminiscent of the idea that minds are a separate category of existence from bodies, and as such is unsatisfactory. More reasonable is panpsychism, which asserts that everything has a mental as well as a physical aspect.⁵⁵ As I like to say, everything has an inside and an outside. On this view, full human agency as we know it is an elaboration of fundamental properties found at the most elementary level of reality.

Even if one does not wish to embrace such an all-encompassing metaphysics, it is clear that what we know of the physical world does not contradict the assertion that some causes are agential rather than purely physical. Quantum indeterminacy comes into play in the interstices of our neurons such that what happens when one makes a choice cannot be predicted, except in statistical terms, from what has gone before. As

⁵² Actually, we have many more than two. Pinker lists ways of knowing about objects, animate things, natural kinds, artifacts, minds, and social bonds and forces (Pinker, *How the Mind Works*, p. 352) as well as logic, arithmetic and probability. (p. 333) He says “We are all intuitive physicists, biologists, engineers, psychologists, and mathematicians.” (p. 301) My remarks about truth apply to all of them.

⁵³ Meacham, “Truth,” reprinted in Meacham, *How To Be An Excellent Human*, pp. 243-248.

⁵⁴ See, for example, von Wachter, “Agent Causation,” and “Free Agents as Cause”.

⁵⁵ Meacham, *How To Be An Excellent Human*, pp. 21-32.

noted above, this feature of our brains provides the spark of novelty that makes at least some of our choices free.

Free Will or Free Won't?

I've heard a number of people say that a well-known experiment performed by neuroscientist Benjamin Libet proves that human beings do not have free will.

They say that Libet's discoveries prove that the choices we think we make are actually caused by brain events before we even know we have chosen! If so, free will is an illusion.

It's not. As is often the case with such research the experimental results are replicable, but the theoretical implications are subject to interpretation. Interpretations differ, and the one given by free-will deniers is, I believe, shortsighted.

Benjamin Libet was a researcher in the physiology department of the University of California, San Francisco, who was intrigued by the difficulty of investigating human consciousness.⁵⁶ The difficulty is this: unlike most of what science investigates, consciousness, or subjective experience, is not available for public inspection. Scientific advance depends on researchers' being able to replicate experiments, to observe the same things that others observe. The public, or objective, world is out there for anybody (or anybody with suitable training) to see. But subjective experiences are, in Libet's words, "available *only* to the individual subject who is experiencing them."⁵⁷ We can observe brain activity through the means of electroencephalography (EEG), positron emission tomography (PET), magnetic resonance imaging (MRI) and the like. We have reason to believe that brain activity is correlated with subjective experience. But we have no way of observing subjective experience publicly. It is private, detectable only by the person whose experience it is. So how can we correlate the two?

Libet's answer was to observe what people *report* about their experience. He would wire a subject up in order to observe brain activity and then apply a stimulus and ask the subject to report on what he or she experienced. In this way he could tell how strong the stimulus needed to be and how long it had to be applied in order to produce a conscious experience of it. He could distinguish between how long it took for someone to detect an event, as evidenced by their involuntary reaction to it, and how long it took for someone to become conscious of it, as evidenced by their report. As it turns out, we take about a half a second to become conscious of something after it happens, but we can react to it without being conscious of it much more rapidly (for example, blinking our eye when something flies toward it).⁵⁸ That finding raises interesting questions about our knowledge of the world. Are we always a half-second behind what really happens? If so, how is it that we get around in the world successfully? But these questions are not my topic in this book.

⁵⁶ Wikipedia, "Benjamin Libet."

⁵⁷ Libet, *Mind Time*, p. 1.

⁵⁸ *Ibid.*, chapter two.

The experiment that has gotten the most attention was an attempt to find out something about voluntary acts, acts in which the subject consciously and deliberately does something. Are voluntary acts similarly delayed?

Prior research had established that shortly before a voluntary act is done, such as flexing one's wrist at a time of one's own choosing, electrical activity in the brain arises, an event termed "readiness potential" (RP). The RP occurs in the brain up to 800 milliseconds before the physical act.⁵⁹ Libet wanted to find out when the subject becomes conscious of the will to act, when consciously wanting or wishing or willing to act occurs, an event he termed "W." W certainly happens before the physical act, but does it occur before or after the RP?

Here is the experiment. The subject, who is wired up, sits before a clock-like device in which a dot of light sweeps around a circle quite rapidly, about two and half seconds per revolution instead of the usual 60 seconds. This device allows measurement of time differences in the hundreds of milliseconds. The subject is told to flex their wrist whenever they choose—a voluntary act—and to note the position of the dot of light when they decide to do it. The experimenter can detect and record when the RP happens and can detect and record when the physical movement happens. The experimenter also records the subject's report of when W happens, so the experiment gathers three data points. The results are then averaged over many trials.⁶⁰ The findings are surprising:

*What we found, in short, was that the brain exhibited an initiating process beginning 550 msec [milliseconds] before the freely voluntary act; but the awareness of the conscious will to perform the act appeared only 150-200 msec before the act. The voluntary process is therefore initiated unconsciously, some 400 msec before the subject becomes aware of her will or intention to perform the act.*⁶¹

So how can we be said to have free will if our choice is actually initiated by brain activity before we even know it? Many people take these results as evidence that our will is not in fact free, but is determined by physical events in the brain.

Libet himself had his doubts. He devised another experiment in which the subject was told to prepare to act at a certain time on the clock-like device, but to veto that expected act when the device reached 100 to 200 milliseconds before the preset time. In this case the RP for the act developed, but then flattened just as the subject was vetoing the act. "This at least demonstrated that a person could veto an expected act within the 100-200 msec before the preset time"⁶² Commentators have called this phenomenon "free won't";⁶³ and Libet thought it demonstrated that we do have free will, but it is limited to vetoing processes that are initiated unconsciously. He distinguishes between an initiation process and a control process, the former being

⁵⁹ Ibid., p. 124.

⁶⁰ Ibid., pp. 126-129.

⁶¹ Ibid., pp. 123-124.

⁶² Ibid., pp. 138-139.

⁶³ Wikipedia, "Benjamin Libet."

unconscious and the latter conscious.⁶⁴ That distinction seems dubious to me, as the experiments are not directly comparable. In one case the subject is told to act when he (or she) chooses; and in the other case he is told to act, not whenever he wants, but at a certain time and to veto the act at a slightly earlier time.

On the face of it, it seems as if our will is indeed determined and not free, but there are numerous objections to this conclusion. The most obvious, perhaps, is that we have no warrant to generalize from the results of a simplified experiment to our experience of willing in general. Libet responds that it is common in science to study a simple system and then find similar behavior in more complicated systems, and the fact that other experimenters have found similar results in variants of the original experiment give us justification to believe that the findings apply to voluntary acts in general.⁶⁵

OK, but there are other ways to challenge Libet's conclusions says the author of the blog *Conscious Entities*:

*We could ... question whether RPs really have the significance attributed to them. We could question whether the unusual circumstances of the experiment, with subjects thinking in advance about making a decision, and then making one for no reason whatever, properly represent normal thought processes. We could take the view that the experiments involve at least two mental reporting processes, one to do with the occurrence of the decision, one to do with the state of the clock, which makes any judgment of simultaneity highly problematic.*⁶⁶

A stronger objection is this:

*Libet often seems to take it for granted that every free act is preceded by a specific act of will, but that isn't really the case. Often the conscious mind sets a general plan, on which we then act more or less automatically. A tennis player has thought in general terms about how to play the next stroke long before the need for actual action; drivers have a kind of running rule in the back of their mind to the effect that if something suddenly appears in front of them, they hit the brake. Free will operates at this higher level, with all our actions being managed in detail by unconscious processes. I don't have to think about where I want to hit the ball at the very moment of decision in order to control my game of tennis any more than I have to think separately about each of the individual muscles I am implicitly proposing to contract.*⁶⁷

As this objection suggests, when we think that brain activity causes what we do, we are not looking in the right place for free will. It has to do with who is acting, that is, who the agent is. When we say "I made the choice" and "I did not make the choice, my brain did it" we use the term "I" to mean different things.

⁶⁴ Libet, *Mind Time*, pp. 143-147.

⁶⁵ *Ibid.*, p. 148.

⁶⁶ *Conscious Entities*, "Astonishing Experiments."

⁶⁷ *Conscious Entities*, "Libet's short delay."

In the former case, when we say “I made the choice,” the word “I” means the whole constellation of elements that constitutes me. I, and not someone else, made the choice; and I am an ongoing pattern of decisions, reactions, thoughts, feelings, emotions and so forth, not to mention a physical body. But in the latter case, when we say “I did not make the choice; it was determined by brain activity,” “I” seems to mean some subset of the elements that constitute me. It’s as if we are thinking of ourselves as a tiny person who lives in the nooks and crannies of the brain and gets buffeted by electrical activity and forced to take action. But that’s not who we are. Each of us is a whole person, and the ascription of agency and free will is properly made to the whole person, not a subset.

Libet has discovered one of the mechanisms by which choice operates in a specific, constrained situation. But you are not the mechanism, you are the agent who incorporates the mechanism; and the laws of agency operate at a higher level than the laws governing the mechanism. The laws that most usefully describe us as whole persons are agential, not mechanical, laws.

By “agential laws” I mean that human beings act on their desires and beliefs, and the way we predict what people will do is not by examining their brain waves but by understanding what they want and what they think is true. And, as I have written above, the way we get them to do something, especially if we want their willing cooperation, is by influencing their desires and beliefs. We change their desires through enticement, persuasion, cajoling, bribery, offers of exchange, reward or punishment and so forth; or we provide evidence to convince them of certain facts; or we do both.

Artificial intelligence researcher Ray Kurzweil makes the point that it is important to model systems at the right (by which he means the most useful) level:

Although chemistry is theoretically based on physics and could be derived entirely from physics, this would be unwieldy and infeasible in practice, so chemistry has established its own rules and models. Similarly, we should be able to deduce the laws of thermodynamics from physics, but once we have a bunch of particles, solving equations for the physics of each particle interaction becomes hopeless, whereas the laws of thermodynamics work quite well. Biology likewise has its own rules and models. A single pancreatic islet cell is enormously complicated, especially if we model it at the level of molecules; modeling what a pancreas actually does in terms of regulating levels of insulin and digestive enzymes is considerably less complex.⁶⁸

Similarly, it works much better to think of ourselves as agents with free will, the ability to decide for ourselves what to do, than to think of ourselves as the effects of neural mechanisms. And in fact even those who profess a belief in determinism act in actual practice as if they can make choices. We have found out a lot about the workings of the brain, and no doubt we will find out more. But knowing how the carburetor works is not the same as being able to drive the car skillfully.

⁶⁸ Kurzweil, *How To Create A Mind*, p. 37.

That said, it is certainly useful to know how the mechanisms work so we can notice when they are operating and what they are doing and decide what to do about it. There are other mechanisms besides brain activity that influence our behavior.

Workout in the Prefrontal Gym

Choices are not always the results of careful deliberation; so when we make them are we doing so freely? When I walk past the plate of cupcakes and impulsively grab one, am I acting freely? You could say that I am not, that I am moved by my impulse.

There are lots of ways our behavior is determined by forces that seem alien to us. I do not mean physical coercion; I mean a spectrum of neurological conditions, at one end of which are disorders such as cerebral palsy, Parkinson's Disease, Tourette's syndrome and obsessive compulsions. At the other end are impulses such as the craving for a cupcake.

Take Tourette's syndrome. People with this condition exhibit facial tics and verbal outbursts over which they have no control. They twitch or say things, sometimes rude and obscene things, but they do not have any sense that they are doing so voluntarily. Nor, for the most part, can they stop them from happening.⁶⁹ We do not call such activities freely chosen. If somehow the twitches or outbursts of such a person caused some calamity, we would not hold that person accountable. Researcher David Eagleman says,

*We immediately learn two things from the Tourette's patient. First, actions can occur in the absence of free will. Second, the Tourette's patient has no free won't. He cannot use free will to override or control what subconscious parts of his brain have decided to do. What the lack of free will and the lack of free won't have in common is the lack of "free." Tourette's syndrome provides a case in which the underlying neural machinery does its thing, and we all agree that the person is not responsible.*⁷⁰

Sleepwalking is another such syndrome. There is a recorded case of a person who killed someone else while sleepwalking. The killer was acquitted of murder charges on the grounds that he did not do the killing voluntarily.⁷¹

In each of these cases and many more we lack a sense of agency, the implicit sense that it is we ourselves who are initiating, executing and controlling our actions.⁷²

On the other end of the spectrum, when we do things in our daily life without thinking we also lack a sense of agency, but more because the issue simply does not arise than because we feel the force of something alien to us. By far the majority of our perceptions and actions happen automatically, without conscious thought. If someone (a philosopher, perhaps) asked you if you tie your shoes of your own free will, you would say "Yes, of course," but you have that sense only because there is nothing to oppose your action.

⁶⁹ Wikipedia, "Tourette syndrome." *Motherless Brooklyn*, quite a good novel by Jonathan Lethem, depicts the syndrome from a first-person point of view.

⁷⁰ Eagleman, "The Brain on Trial."

⁷¹ Ibid.

⁷² Wikipedia, "Sense of agency."

Suppose you are trying to lose weight, however, and you have resolved to cut sweets out of your diet. When you impulsively grab the cupcake, you are clearly not acting of your own free will; you are, as it were, enslaved by your craving. If you think about it you get the distinct sense that your will is not free.

The craving for a cupcake is a first-order desire, a desire simply to do or to have something. Most of our desires are first-order, and most of our actions and activities as we unreflectively go through life are aimed at satisfying them. So in most of our life we are determined, not free.

But we humans also have the capacity for second-order thinking, thinking about ourselves, and that capacity enables us to have second-order desires, desires to have certain desires. Wanting the cupcake is a first-order desire. So is wanting to lose weight, but it is in conflict with wanting the cupcake. When you reflect on the situation and decide that what you really want is to stick to your diet and lose weight, you are *wanting to want* self-control more than the cupcake. That is a second-order desire. The second-order aspect of yourself wants the first-order aspect to want something, typically something different from what the first-order aspect actually wants.

Even stronger is second-order volition, where you want a certain desire to be your will, i.e. what actually impels you to action. Not only do you want to want to eat something healthy and want not to want the cupcake, but you also want the desire to eat healthily to overrule the craving, to be the desire that actually results in action so that you end up eating the healthy food. As I discuss in *How To Be An Excellent Human*, second-order volition is an aspect of the second-order thinking that is uniquely human.⁷³ Freedom of the will consists in being able to make second-order volitions effective; that is, to have the second-order volition actually govern the first-order volition such that the preferred first-order desire is what results in action. When that happens, we judge that our will is free. Philosopher Harry Frankfurt says “It is in securing the conformity of his will to his second-order volitions ... that a person exercises freedom of the will. ... The unwilling addict’s will is not free.”⁷⁴

Recall that Robert Kane defines free will in a similar way:

*Free will ... is the power of agents to be the ultimate creators (or originators) and sustainers of their own ends or purposes. ... To will freely ... is to be the ultimate creator (prime mover, so to speak) of your own purposes.*⁷⁵

To be the prime mover of our own purposes is to exert second-order control over our desires and volitions. First-order desires are, by and large, determined by our genetic heritage and our upbringing. Only when we notice them and think about whether we really want them do we exert free will and exercise our second-order volition.

⁷³ Meacham, *How To Be An Excellent Human*, pp. 129-133.

⁷⁴ Frankfurt, *The Importance of What We Care About*, pp. 20–21.

⁷⁵ Kane, *The Significance of Free Will*, p. 4.

In order to do that, to exert second-order volition, we have to use our second-order thinking to figure out what is actually going on in the first-order desires. That's where brain research helps a lot. Here is an account of some recent research on patience and impulse control:

When people waited for a reward, patient people were seen—through the lens of a functional magnetic resonance imaging (fMRI) machine—imagining the future. In more patient people, the researchers observed increased activity in the region of the brain that helps you think about the future (the anterior prefrontal cortex). The patient individuals, it seems, devoted more energy to imagining receiving their reward later.⁷⁶

The more vivid our imagination of the future reward, the less likely we are to be tempted by an immediate, but lesser, reward. Once you know that fact about how your brain works, you can put it to use. You can decide ahead of time, before you get near the cupcake, to envision yourself clearly as a slim, healthy person and to imagine vividly how good it will feel to be that way. You can take other actions as well, such as not going past the bakery that sells the darn things. The trick is to take actions in advance of temptation to strengthen your ability to withstand it, actions motivated by your second-order thinking.

David Eagleman proposes something similar to rehabilitate criminals who suffer from poor impulse control. We know that the prefrontal cortex of the brain is where the ability to control impulses is rooted. “The frontal lobes are sometimes called the organ of socialization, because becoming socialized largely involves developing the circuitry to squelch our first impulses,” he says.⁷⁷ That's why teenagers are so impulsive; their prefrontal cortex is not yet fully developed. Eagleman has a plan for what he calls “the prefrontal workout.”

The basic idea is to give the frontal lobes practice in squelching the short-term brain circuits. To this end, my colleagues Stephen LaConte and Pearl Chiu have begun providing real-time feedback to people during brain scanning. Imagine that you'd like to quit smoking cigarettes. In this experiment, you look at pictures of cigarettes during brain imaging, and the experimenters measure which regions of your brain are involved in the craving. Then they show you the activity in those networks, represented by a vertical bar on a computer screen, while you look at more cigarette pictures. The bar acts as a thermometer for your craving: if your craving networks are revving high, the bar is high; if you're suppressing your craving, the bar is low. Your job is to make the bar go down. Perhaps you have insight into what you're doing to resist the craving; perhaps the mechanism is inaccessible. In any case, you try out different mental avenues until the bar begins to slowly sink. ... The goal is for the long term to trump the short term. Still looking at pictures of cigarettes, you practice making the bar go down over and over, until you've strengthened those frontal circuits.

⁷⁶ Bauer, “How to Avoid the Temptations of Immediate Gratification.”

⁷⁷ Eagleman, “The Brain on Trial.”

*After training at the prefrontal gym, a person might still crave a cigarette, but he'll know how to beat the craving instead of letting it win. It's not that we don't want to enjoy our impulsive thoughts (Mmm, cake), it's merely that we want to endow the frontal cortex with some control over whether we act upon them (I'll pass).*⁷⁸

This approach is still experimental, but it is clear that it is a way of training the will. It strengthens the ability of our second-order thinking—which we identify as being more truly who we are than our first-order thinking is—to govern our first-order desires.

Philosophers have long known the importance of strengthening the will. Plato, in *The Republic*, speaks of the soul (*psyche*) as having three parts, the part that just wants pleasure, the part that likes to make things happen, and the rational part, which can think and reflect. “Does it not belong,” he says, “to the rational part to rule, being wise and exercising forethought in behalf of the entire soul ...?”⁷⁹ Exercising forethought about yourself is exactly second-order thinking.

Much more recently William James had the same idea. He advocates doing something every day that you (your first-order self) would rather not do, just for the purpose of strengthening the “faculty of effort,” by which he means what I call the second-order will. With typical Jamesian floridity, he says “The man who has daily inured himself to habits of concentrated attention, energetic volition, and self-denial in unnecessary things ... will stand like a tower when everything rocks around him, and his softer fellow-mortals are winnowed like chaff in the blast.”⁸⁰

The point of philosophy is to learn how to master your life. Knowing what you have to work with is essential to that effort; and certainly knowing how your brain works to influence what you feel, think and do is an important part of that knowledge.

But there is a potential problem with free will taken as second-order volition. What if the second order is itself not free, but controlled by someone else?

⁷⁸ Ibid.

⁷⁹ Plato, *The Republic*, 441e.

⁸⁰ James, “The Laws of Habit.”

Mental Parasites

What if your brain were taken over by a parasite and made you want something you would not ordinarily want? What if it took over your second-order thinking and made you want to want that thing? Would your will then be free?

This is not so far-fetched a scenario as it might seem. There are numerous examples of parasites infecting the brains of animals to make those animals act contrary to their own well-being. Here is one:

*The lancet liver fluke *Dicrocoelium dendriticum* has a very busy life. As an adult it spends its time in the liver of a cow or another grazing mammal. Here it mates and lays eggs, which are excreted in the host's feces.*

A snail eats the poo, taking in the eggs at the same time. The eggs hatch in the snail and make their way into its digestive gland, where they asexually reproduce. They then travel to the surface of the snail's body. As a defensive maneuver, the snail walls the parasites up in cysts and coughs up the balls of slime...doing exactly what the parasites wanted it to do.

An ant comes along and gobbles up the fluke-laden slime balls. The flukes then spread out inside of the ant, with a couple of them setting up shop in the insect's head. When night approaches, the flukes take control. They make the ant climb up a blade of grass and hold tight, waiting to be eaten by a grazing animal. If the ant is still alive at dawn, the flukes release their control and the ant goes about its day like normal (if the ant baked in the sun, the parasite would die, too). At night the flukes take over again and the cycle repeats until the ant becomes cattle food.⁸¹

It's doubtful, of course, that the lancet fluke actually wants its host to do anything. That is just a figure of speech. But what is clear is that the ant's climbing up the blade of grass has nothing to do with its own survival and well-being. Its mind, tiny as it is, has been hijacked by the parasite. If it had enough mentality to reflect on what it is doing, the ant could probably find plausible and compelling reasons for its actions. Perhaps it feels good to climb. Perhaps hanging out at the top of the blade of grass feels tranquil and comfortable. Or exhilarating. We'll never know. But we can find out how it feels in our own case, because we too are subject to parasitic hijacking.

Daniel Dennett makes the point that certain memes have the same effect on humans that the lancet fluke has on ants. A *meme* is a unit of cultural transmission, similar to the gene, which is a unit of biological evolution. Like a gene, a meme is a replicator, except memes replicate contemporaneously between minds rather than historically between bodies.⁸² A meme is an idea or information packet that replicates itself by passing from mind to mind. Says Dennett,

⁸¹ Bennington-Castro, "12 Real Parasites That Control the Lives of Their Hosts."

⁸² Dawkins, *The Selfish Gene*, chapter 11, pp. 189–201.

*It's ideas—not worms—that hijack our brains. ... There are a lot of ideas to die for. Freedom. ... Justice. Truth. Communism. Many people have laid down their lives for communism, and many have laid down their lives for capitalism. And many for Catholicism. And many for Islam. These are just a few of the ideas that are to die for. They're infectious.*⁸³

Such hijacking might be innocuous and unintended, the product of cultural memetic replication like a catchy tune, or it might be quite deliberate, as in brainwashing or propaganda. For example, here are a few memes that may have been installed in you or someone you know.

- Those of other religions than yours are heathens and infidels and must be stopped at any cost.
- Your form of government is the best one and works for your benefit.
- People of your race (or gender or nationality, etc.) are better than those of other races (or genders or nationalities) and deserve better treatment.

And so on. You can probably think of more. In all these cases, our beliefs can induce us to act contrary to our own well-being (and to our genetic fitness as well, but that is not usually our concern).

But regardless of the effect on our own well-being, when we are so induced we seem to act as we do voluntarily, of our own free will. And yet, something else—our parents, our community, our culture, the information media we are exposed to, the government, the dominant economic class, etc.—determines our will, i.e. what we want, choose and strive for. And furthermore, that something determines our second-order will as well, what we want to want.

I have noted with approval philosopher Harry Frankfurt's notion that freedom of the will consists in being able to make second-order volitions effective. It is second-order volition—our ability to control what we want based on our capacity for reflective self-evaluation—that distinguishes us humans from other animals. Our will is free, he says, when we succeed in making our second-order volition effective; that is, when the second-order volition actually governs the first order such that the preferred first-order desire is what results in action. When that happens, we judge that our will is free.⁸⁴

But what if somebody else controls our second-order will? Such a thing is quite possible through brainwashing, application of propaganda, and behavioral conditioning as depicted in the novel *Walden Two*.⁸⁵

Robert Kane calls such control Covert Nonconstraining Control, or CNC. In cases of *constraining* control, a person is forced by physical causes to act against his will, for

⁸³ Dennett, Daniel C. "Dangerous Memes."

⁸⁴ Frankfurt, *The Importance of What We Care About*, pp. 20–21.

⁸⁵ Skinner, *Walden Two*, pp. 243-248.

example by being physically threatened or locked up. In cases of *nonconstraining* control, a person's will is manipulated so that the person willingly does what the controller wants done. The person is not obviously constrained, but is controlled nonetheless. Examples include operant conditioning, behavioral engineering and other forms of manipulation. CNC, covert nonconstraining control, occurs when the manipulation is hidden from the person being manipulated; that person does not know he or she is being manipulated and perhaps does not even know that the manipulators exist.⁸⁶

When we find out that we have been manipulated we typically feel outraged. Take the fictional account of the fantasy world of Harry Potter. In that world one of the unforgiveable curses is *Imperius*, by which the witch or wizard controls the victim's will. It is unforgiveable because it violates one of the most central aspects of our identity, the sense that we are in charge of our choices, and that our choices define (or reveal) who we are. Nobody wants to be a puppet. (The other thing that is central to our identity is how we perceive reality, our own unique point of view. But our perception, seemingly more passive, is not quite so central. Were we to find out that someone had distorted our perceptions, we would feel anger at being lied to, but not, I suspect, outrage at being controlled.)

So is our will free when we are covertly constrained? No, obviously not. Our choices and resulting actions are not ours, but our controller's. But do we still have free will? In the sense of having the capacity for it, yes.

That capacity—whether or not it is actually exercised at any given time—is rooted in our capacity for reflective self-awareness, or second-order thinking. If your second-order will is determined by someone else, as soon as you know it you can take steps against it. Or for it, if you decide you like it that way. The point is, once you know someone is trying to control you, you have a choice about it. Second-order thinking is, potentially, self-correcting.

Now clearly it might not be so easy to find out. If your manipulator is sufficiently skilled, it might be very, very difficult indeed. You would feel no impulse to find out if you did not even suspect that you might be subject to manipulation.

That's why philosophy is, in some ways, a subversive concern. Socrates famously asserted that the unexamined life is not worth living.⁸⁷ If we desire wisdom we are advised to examine our lives even if there appears to be nothing to be concerned about. A manipulator would not want you to do that, because you might discover the manipulation. Having discovered it, however, you would be better off, as you could then take steps to take back your will.

Eternal vigilance, it seems, is the price not only of political liberty⁸⁸ but of freedom of the will as well.

⁸⁶ Kane, *The Significance of Free Will*, pp. 61-67.

⁸⁷ Plato, *Apology*, 38a.

⁸⁸ Berkes, "Eternal vigilance is the price of liberty (Quotation)."

The Choice Event

Agent causation intersects with physical causation—we might say it intervenes in the physical world, except that that assertion is metaphysically problematic—when we make a choice. The “choice event,” as it is called,⁸⁹ initiates a chain of events that was not wholly caused by prior physical events or by prior mental states of belief and desire. It is where each one of us makes a difference in the world.

The choice event is a bifurcation point. Before the choice, more than one future is possible. Afterwards, one possibility has been made actual, and all others have been excluded. (By “actual” I mean that we each can detect it, as can other entities, and that it stays put, so to speak. It doesn’t change; the past is fixed.)

In that moment you define your future self. That self is the one that you will know from the inside—it will be the continuity of your present interiority—and the one others will know from the outside. If we are to know ourselves, as the Oracle at Delphi advised, this would be a good place to investigate.

But what is this choice event? We experience it most starkly when we have conflicting desires or inclinations, each of which is as strong as the others. I am walking and come to a fork in the path. Shall I go to the left or the right? If I much prefer what lies to the left, then the choice is simple; but if I like both, then sometimes even I cannot predict which way I will go. I am traveling and see someone in trouble by the side of the road. I want to help, but I am on my way to an important meeting and do not want to be delayed. My choice in this situation will affect not only the suffering person but also myself, and not just for today. It will affect the content of my character, adding one more reinforcement to my habit of being generous and compassionate or being self-centered and uncaring. What happens at times like these, some inconsequential and some momentous?

Choice events are not observable from the outside. They are interior and private to each one of us. If we are truly to know ourselves, we must observe, carefully and without preconception or bias, so far as we are able, what happens when we choose. It seems appropriate to investigate it from the first-person point of view, our own point of view, because it is we ourselves (each one of us) who will directly benefit from the findings.

But first-person investigation is not easy. Usually when we think about a choice event, it has already happened. After the fact we can say that one or the other reason was more persuasive. But can we say, before the choice is made, which one has more weight? If we could, the choice would already have been made, and we could then ask about the time before that, before we noticed or decided which one would prevail. We are in danger of an infinite regress.

Can we, then, actually observe ourselves making a choice? Can we observe, in the moment of choosing, what happens? To do so would require quite a high degree of

⁸⁹ von Wachter, “Free Agents as Cause,” p. 3.

second-order thinking. It would be easier to try it in an artificially constructed situation, similar to that encountered by Buridan's ass.

"Buridan's ass" refers to a thought experiment attributed to the 14th century French philosopher Jean Buridan, although its origins go back to Aristotle. An ass (donkey) that is equally hungry and thirsty is placed precisely midway between a stack of hay and a pail of water. The scenario assumes the ass will always go to whichever is closer, so it will die of both hunger and thirst since it cannot make a decision to choose one over the other. A variant substitutes two identical piles of hay for the hay and water; the ass, unable to choose between the two, dies of hunger.⁹⁰

Of course we know that a real donkey would not in fact stay there in stasis. But what happens to make it go to one alternative or the other? We can't tell from the outside. Perhaps a random breeze makes one alternative smell better than the other. But one could try putting oneself into a similar situation to see what happens.

I, the author, did that once. I stopped at a fork in a trail and just observed myself to see what would happen when I chose the left or right path, which turned out to be nothing at all until my mind wandered. I forgot to watch—some other thought arose—and then I found myself walking along the right-hand path past the fork. So I don't know what happened at the moment of choice!

The situation may be analogous to the Quantum Zeno effect, in which repeated observations of an unstable quantum system prevent it from transitioning from one state to another.⁹¹ Once the observation stopped, my volitional system made a leap, and one of the choices was actualized and the other, extinguished. Just as it is a mistake to attribute the sense of "I" to a subset of oneself causally affected by a brain event, it may be a mistake to try to observe too closely the choice event in hopes of finding a definitive entity that makes the choice.

Or the absence of such an entity may be an important clue to the ultimate nature of reality. But that speculation is beyond the scope of this little book.

⁹⁰ Wikipedia, "Buridan's ass."

⁹¹ Jones, "Quantum Zeno Effect." See also Wikipedia, "Quantum Zeno effect."

Making the Most of Free Will

By now I hope you are convinced, if you weren't already, that your will is free in the sense that you can indeed determine and control your actions by thinking about them and deciding what to do, and that such thinking is effective. In other words, you do have a genuine ability to influence the course of affairs. You can act for good reasons, and in doing so you define yourself as someone who acts for those reasons. The key to this ability is the peculiarly human virtue, the capacity for second-order thinking, i.e. thinking about yourself as thinker. You are an agent, not an automaton. Both indeterminists such as Robert Kane and determinists such as Daniel Dennett agree in this regard. Regardless of whether we think the effects of quantum-level causal indeterminacy have an influence on our choices or not, the most effective way to think of ourselves is in agential terms.

Recall that Dennett says that believing that one lacks free will would disable a person as a chooser.⁹² Being disabled is one end of a spectrum that, on its other end, includes being fully enabled to make choices. There are more and less effective ways to make choices. But what makes an effective chooser?

The effective chooser is one who can put his or her second-order intentions (in the everyday sense) into practice. The effective chooser has learned how to overcome or bypass conditions that prevent him or her from carrying out what, after due deliberation, he or she has decided to do.

The conditions that prevent us from doing what we rationally desire and choose are many, and they stem from the fact that we are not fully rational beings. Rationality—the ability to foresee consequences of our actions and to plan ahead—is a relatively late development in the evolution of our species. By far the majority of our actions and decisions are made on the basis of instinct, habit and cultural conditioning. Here are just a few examples:

- Our instincts for what foods are desirable lead us to crave excessively fatty, salty and sweet things because such foods were scarce in the environment of evolutionary adaption in which our character as a species was formed. We eat junk food even though we know better.
- Most of our everyday actions are the result of snap decisions based on intuitive feelings of attraction or aversion, and we form habits merely on the basis of repetition of such actions. Our ability to form habits is also evolutionarily adaptive, as it would have reduced our ancestors' ability to survive and reproduce if they had had to laboriously think through what to do time after time. But no doubt we can all think of habits that are not good for us, such as, perhaps, the habit of indolence when exercise would be better, or the habit of criticizing others when restraint would more effectively get us what we want.

⁹² Dennett, *Elbow Room*, p. 168.

- We could not survive without culture, without groups of people to belong to. But our culture may not serve our best interests. We may find ourselves entranced by celebrities and products, the aim of which entrancement is to keep us spending money, not to acquire wisdom. Too often our groups define themselves in opposition to other groups, and we find ourselves acting hatefully or derogatorily toward people who are different from us even though our lives would be enriched if we could appreciate their way of approaching the world.

In cases such as these our rationality tells us one thing, but we act in another. Our will is not free.

Psychologist Jonathan Haidt has an instructive metaphor to describe this predicament, that of a rider on an elephant. We each have a two-fold nature. The rider part is how we like to think of ourselves, as rational beings in charge of our actions. The elephant part is the instinctual desires and reactions that really, in a great many cases, determine what we do. Says Haidt,

*The image that I came up with ... was that I was a rider on the back of an elephant. I'm holding the reins in my hands, and by pulling one way or the other I can tell the elephant to turn, to stop, or to go. I can direct things, but only when the elephant doesn't have desires of his own. When the elephant really wants to do something, I'm no match for him.*⁹³

Each of us is subject to numerous automatic mental processes and emotional reactions that have a great influence on our behavior regardless of—and in many cases in opposition to—our conscious intent. Those are the elephant. You can find lots of information about them; look at the work of Daniel Kahneman and Jonathan Haidt for starters, and at numerous other accounts of brain functioning and evolutionary psychology. I expect that you can think of examples in your own life.

We can't get along without the elephant. The second-order self—the part of us we identify with in our cooler moments—could not exist without the first-order self. For maximum health and well-being we need to learn how to nurture both. The effective chooser keeps the first-order self alive and functioning well in accordance with guidance from the second-order self. To be an effective chooser is to be an effective rider; that is, to manage the automatic reactions so as to accomplish our chosen goals.

The trick is to learn how to influence the elephant. As Haidt notes, it is hard to overcome an instinctive impulse by sheer will power. Numerous psychology and self-help books give specific techniques, but each of us must find out which of those techniques apply to our own case. All of them work best within a common approach, an iterative process:

1. Observe yourself and your life carefully and, as much as possible, without bias. Find out what works to bring you the satisfaction of functioning well, and what

⁹³ Haidt, *The Happiness Hypothesis*, p. 4.

doesn't. Observe the patterns, the regularities, in your life and note their effects. Find out which ones serve you and which don't.

2. Act on what you find out. Such action requires two things:
 - a. Plan to do something differently. Think of some way to improve the situation.
 - b. Do it. Try it out.
3. Perform this cycle repeatedly.
 - a. Observe (step 1). Evaluate the results of your actions.
 - b. Act (step 2). Change the plan if needed and try it again.

What we want is as accurate and repeatable a process of adaptation to and mastery of ourselves as possible. Following this process is a way to achieve that end.

The first step to effective self-guidance is self-awareness. You have to get to know the elephant before you can influence it. As I have discussed in previous chapters, it is our ability to know ourselves, our capacity for second-order thinking, that distinguishes us from other animals and the exercise of which can lead to a fulfilling life. So the first step is to examine yourself. See what controls your will.

The second step, to act on what you find out, is where the rubber meets the road, so to speak, and is the least amenable to generalization. Each of us is unique and we each need to find ways to train our own elephant. Some general tactics are described in my *How To Be An Excellent Human*: Form good habits. Overcome afflictive emotions by careful observation of their process of arousal so you can intervene before they blow up. Enervate and remove patterns of rigid reactivity by physical release of painful emotion through tears, laughter, trembling and the like.

The most important technique is to align yourself ahead of time with your chosen course of action. Decide when you are clear headed and not stressed. Devise a way to remind yourself of your decision when you are in danger of getting sucked into something not in alignment with it.

And the effort is not a one-time thing. Having tried something—the formation of a habit, perhaps, or the resolution to observe yourself more carefully when an elephantine reaction threatens to arise—then check to see if your tactics work. If so, keep on with the plan. If not, adjust your tactic or try something else altogether. In either case self-knowledge is crucial. If you know the reason for your chosen tactics, then it is easier to keep choosing them whenever you have a moment of self-reflection in your busy in-the-world life.

The point is that with practice and learned skill, the second-order self can exert control over the first-order self. Our rational faculty of figuring things out, sometimes

called cold cognition,⁹⁴ can exert influence downward so that the moment-by-moment choices of hot cognition are woven into a harmonious pattern. The more successfully we exert such control, the more our will is free.

⁹⁴ Cosmides and Tooby, "Evolutionary Psychology and the Emotions," p. 98.

Final Reflections

When we choose something we add weight to it, as it were. It becomes more likely to become (or remain) a reality. (This is a Pragmatic assessment of the concept of choice. It defines choice in terms of its effects, what it causes to happen.) The effect of choice is to increase the probability that what is chosen will take place.

Choice defies inevitability. What appears to be inevitable is what would be the case without our intervention. But after we intervene, what would have happened without our intervention is seen to have been avoidable (“evitable”). It was in fact avoidable from the point of view of the actor, now, who has avoided it.

Our choices create our reality, not in any absolute sense, but in the sense of influencing how the world appears to us. This is particularly true in the social world, as the way we treat others strongly influences how they treat us. It is not very true in the physical world; we can’t choose to overcome gravity by sheer force of will, for instance. It is most true in the personal world of our own being, not just our sense of ourselves, but the actuality of who we are. What we choose could be a specific course of action or a habitual way of being that becomes part of our character. In either case we become the person who has made that choice. There is a germ of truth in Sartre’s assertion that “Man is nothing else but that which he makes of himself.”⁹⁵ Sartre overstates the case no doubt, as we operate within many constraints; but we humans, alone among the beings we know, can transcend ourselves and thereby make ourselves as we choose to be.

But on what basis shall we make that choice? What is the best thing to choose? What is important enough to care about with sufficient intensity that we strive to achieve it?

These questions are among the perennial questions of philosophy, and their answers are not given for all time or from on high but instead must be answered by each of us. All I can do is give some advice.

We all want to thrive and lead fulfilling lives. Thinkers as diverse as Kant and Socrates agree that the desire to survive, thrive and feel happy and fulfilled is fundamental and essential to all humans. If you disagree and think something else is more to be desired—to do our duty to God, perhaps, or to live for others—, then consider that in order to fulfill that desire, you would have to survive and thrive at least enough to be able to attain it, and once you attained it, you would, I presume, feel happy and fulfilled. So functioning well enough to survive and thrive is the fundamental aim of all of us.

So how can we thrive? The answer requires another whole book, which, as it happens, I have already written.⁹⁶ To summarize, we do not exist in isolation but are constituents of a larger whole. We are, as it were, parts of a larger organism. We thrive

⁹⁵ Sartre, Jean-Paul, “Existentialism is a Humanism”.

⁹⁶ Meacham, How To Be An Excellent Human.

when the larger organism thrives, just as our hands or livers thrive when we thrive. And, when the parts thrive, the organism thrives.

We thrive by aligning ourselves with beneficial larger patterns of life and activity. As Daniel Dennett has noted, the secret of happiness is to find something more important than you are and dedicate your life to it.⁹⁷ I suggest that the largest and most important thing is health of the whole and all that is within it.

Here we are. Our task, if we choose to accept it, is to survive and thrive for the benefit of all beings. We are to navigate reality for the benefit of all concerned with a high degree of self-awareness, in fact with the highest degree of self-awareness that we can muster.

In so doing, in working for the good in all things, we fulfill ourselves, we live up to our potential, and we spread health and happiness all around us. That is a worthy goal indeed, and an excellent way to exert our free will!

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Note: In addition to being an essay of some importance (in my humble opinion) in its own right, this book is an unabashed attempt to get you to buy my other book, *How To Be An Excellent Human*. If you like my writing and my approach to philosophical questions, please take a look at it here: <https://www.createspace.com/4051825>.

You can also find a lot more of my writing freely downloadable at <http://bmeacham.com/>.

⁹⁷ Dennett, "Dangerous memes," at time 5:05.

Appendix A, Determinism and Prediction

With the notable exception of chaotic systems—those in which slight variations of initial conditions produce widely diverging outcomes⁹⁸—the theory that everything is determined generally entails that future states can be predicted from current or past states of the system under investigation. The possibility of accurate prediction has a distinct bearing on questions of determinism and free will. For the most part, if something cannot be predicted with accuracy, then it is not determined.

Materialists base deterministic beliefs on physical causality, the idea that physical events happen inexorably as a result of prior physical events. Taking human beings to be nothing more than complex aggregations of physical matter, they believe that our sense of free will is illusory, and that all is determined by the past. If we insist that such a view entails that we could fully predict the future, we run into a problem. For any system that engages in substantial interaction with its environment and is complex enough to be interesting, it would be computationally unworkable to predict its future states in their entirety. We might get better and better, of course, but could not achieve 100 percent accuracy. Even disregarding quantum indeterminacy, it is in practice impossible fully to predict the future.

Even so, some insist that it could be possible in principle. If we had a powerful enough computer and enough data, they say, we could do it. This was the view of the Marquis de LaPlace, who wrote,

*We may regard the present state of the universe as the effect of its past and the cause of its future. An intellect which at a certain moment would know all forces that set nature in motion, and all positions of all items of which nature is composed, if this intellect were also vast enough to submit these data to analysis, it would embrace in a single formula the movements of the greatest bodies of the universe and those of the tiniest atom; for such an intellect nothing would be uncertain and the future just like the past would be present before its eyes.*⁹⁹

LaPlace knew nothing of computers, but LaPlace's demon (so-called; he himself did not use that term¹⁰⁰) takes the place of one. The problem is that, given the openness of systems to external influences, such a computation would mean ultimately that we would need to predict the future of the entire universe. To do so would require a computer with a data store larger than all the items we would need to keep track of, hence larger than the universe. Not to mention that the computer itself would presumably be part of the universe and thus would itself need to be modeled. This scenario ends up in absurdity.

At the quantum level the future state of an individual object or event (at that level, the distinction between the two is tenuous at best) is indeterminate; events can be predicted only statistically. However, the statistical predictions are quite accurate and

⁹⁸ Wikipedia, "Chaos theory."

⁹⁹ LaPlace, *A Philosophical Essay on Probabilities*, p.4.

¹⁰⁰ Wikipedia, "LaPlace's demon."

replicable. This leads some materialists, who believe humans to be entirely physical, to assert that human beings are determined because we can predict physical reality with accuracy. This does not hold either. It is the same as saying that people are determined because given a population of them we can predict how many will choose one thing over another—to vote Republican or Democrat, say. Or that an individual is determined because over a span of time we can predict how often that person will choose one thing over another—to eat vanilla ice cream or chocolate, for instance. But even given the accuracy of such statistical predictions, we are unable to predict a single instance with certainty. We can't fully predict how a particular person will vote or what food that person will choose at a particular time. The single instance of person or time is analogous to the single photon fired at the photographic plate in the Double Slit experiment.¹⁰¹ We are unable to predict where it will be detected, even though we can predict the statistical aggregate quite nicely. And that is the essential point about ourselves as agents, that in every moment there is the possibility that we will do something unexpected.

¹⁰¹ Wikipedia, "Double-slit experiment."

Appendix B, The Double-Slit Experiment

A famous experiment, widely replicated, called the Double-Slit experiment reveals the strangeness of the quantum level of reality, the level of the very, very tiny.¹⁰² The experiment consists of sending a beam of coherent light¹⁰³ through two side-by-side vertical slits to a recording medium, such as film; and it shows, among other things, that light can behave both as a stream of particles and as a wave. It also illustrates quantum indeterminacy.

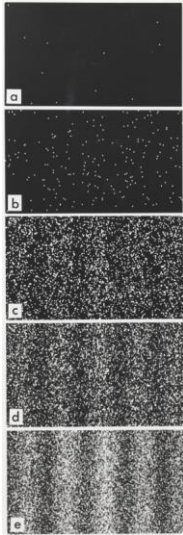
When light is sent through one slit at a time, a vertical band appears. In this case light acts like a series of particles that go through the slit, hit the recording medium and make an impression. If the experimenter opens the slit on the right, the band appears on the right, and if the experimenter opens the slit on the left, the band appears on the left.

One would expect that if both slits were opened, the result would be two side-by-side bands. In fact, however, the result is a strong band in the middle, the expected bands on the left and right, and then dimmer bands extending outward in each direction. Light in this case acts like waves that cause interference patterns. That is, when a crest meets a crest, a more intense crest results; and when a crest meets a trough they cancel out. The bands of light are from the crests reinforcing each other, and the darkness in between is from crests and troughs canceling each other out. Here is a picture showing photon buildup over time from top to bottom.¹⁰⁴

¹⁰² Wikipedia, "Double-slit experiment."

¹⁰³ "Coherent" means that all the light waves have the same frequency; hence they can interfere with each other. Lasers emit coherent light. If you shine an ordinary light through a small pin-hole, the light that gets through is largely coherent as well.

¹⁰⁴ "Double-slit experiment results Tanamura 2" by user:Belsazar - Provided with kind permission of Dr. Tanomura. Licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:Double-slit_experiment_results_Tanamura_2.jpg.



Even more interesting, when light is emitted one photon at a time and aimed at the two slits, it shows the same interference pattern! One would expect that a photon would go through one slit or the other. In fact it appears to act like a wave that goes through both slits, interferes with itself, and results in an impression in one and only one of the bands.

And one cannot predict in advance in which band the photon will make an impression.

One can predict that given a great number of photons, they will result in bands. That is, they won't all end up in the same place, but rather in various places according to their probability distribution. But there is only a probability, not an absolute certainty, that any single photon will end up in one place or another. This state of affairs shows quantum indeterminacy, our inability to predict the final location of any single photon. A photon is not like a billiard ball. If you know the mass of two billiard balls, the amount of force and its direction applied to one, and the angle at which it hits the second, you can predict in what direction and how fast the second ball will travel. Not so with quanta. The sequence in which the singly-emitted photons will arrive is completely unpredictable.

We might well ask what causes the wave, which is mathematically described as a collection of probabilities of being detected in various places, to be in fact detected at only one place. We seem to have a radical discontinuity of causality.

Appendix C, Agential Determinism

There is another form of determinist belief, which is based on agent causality: *predestination*, the belief that a divine entity has already determined what will happen, and in particular all the choices we will make. Consider the phrase “It is written,” a phrase used in many cultures to express the belief that our choices and our destiny are fated, determined in advance. Writing implies a writer. This view is equally as deterministic as the physical variety in that it asserts that our sense of free will is illusory, but for a different reason. It is because God—a form of agent with much greater powers than human beings have—has already chosen for us.

This is a much more interesting form of determinism, because it leaves open the possibility of something unexpected happening. But it says there is only one agent, not many. If that one agent is taken to be God in the sense of an author or creator of the universe who is in some way separate from or outside of his (or her) creation, then the practical meaning is not much different from physical determinism. In both cases, all is determined and we have no free will.

If God is taken to be the One Being or Universal Soul of advanced mysticism, however, the situation is different because the Universal Soul is, in this view, the Soul of each one of us. Thus, each one of us could be said to have free will, the power to choose.

If that is so, does the individual taken as individual have any choice? Is it fair or accurate to credit the individual with having made a good choice or blame the individual for having made a bad one? These questions are at the heart not only of what makes any of us human but of what makes each one of us who we are.

Recall that Daniel Dennett says that believing that one has free will is itself one of the necessary conditions for having free will.¹⁰⁵ This observation applies equally to the believer in physical free will and to the believer in agential free will. This short book is no place for a full discussion of metaphysical intricacies, but it seems reasonable to assume that if each individual is an expression of the One Being, then that expression would include freedom of will as well as agency, perception, thought, intuition and feeling.

In this view, each of us is indeed free to make choices. The trick is to discern the desire of the One Being. When your choices are in harmony with the Divine Will, things work out for you much better than when they are in discord with it.

¹⁰⁵ Dennett, *Elbow Room*, p. 168.

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