

Classic Text 14: Determinism and Freedom

“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.”

“The intellect” here also known as “**Laplace’s Demon**” is from his 1814 *A Philosophical Essay on Probabilities*.

Laplace’s Demon need not be an actual “demon”. It could be a vast super-computer simulating all the particles in the entire Universe. If you have read Laplace’s words above for the first time you may be either in awe or apprehensive. Either way, they are arguably the earliest and most succinct statement of modern determinism. (By “modern” in Philosophy we mean since Kant, *circa* 1800.)

There are many varieties of determinism stretching back to antiquity; however the one we are concerned with here is that of **causal determinism**, according to which “every event is necessitated by antecedent events and conditions together with the laws of nature”. According to this definition, determinism is true, if and only if, the way the world is at time t , fixes or determines the way things go at a later time *as a matter of natural law*. (Hofer, 2010) The fear among many is that this leaves no elbowroom for freedom of the will or human agency. There are several responses to such a concern, including:

- Denying that determinism is true
- Accepting that determinism is true and denying the humans have free will
- Insisting that humans have free will, in spite of determinism
- Demonstrating that humans have free will because of determinism

There are several other variants; however these are the positions we shall examine. Before doing so we should clear away some of the ideas often *mistaken* for causal determinism. These include: predeterminism, fatalism and theological determinism.

Predeterminism holds that all events, past, present and future, have already been determined or known (perhaps by God) since the origin of the Universe. Accordingly, there is an unbroken causal chain stretching back from the state of the world today to the very first cause or causes. What humans or other creatures might do can in no wise influence the outcome of events one way or the



*Pierre-Simon Laplace (1749–1827)
Astronomer, Physicist and
Mathematician Extraordinaire*

other; indeed, our every action was predetermined even before we were conceived. We are just so much flotsam and jetsam borne along the tide of cosmic history. What was for Laplace only speculative, today is commonplace in cosmology. The initial state of the Universe is represented mathematically by a wave function, ψ , containing all the information about the system, which is then observed to evolve. Of course, cosmologists are only working with mathematical models and powerful but limited supercomputers, fed with at best, the latest available estimates of initial conditions; however Laplace's Demon would have no such limitations. The entire history and future of the Universe would be transparent to it in every miniscule detail.

For reasons that have more to do with physics than philosophy, such a scenario is not only implausible but impossible. According to Heisenberg's **Uncertainty Principle**, for one, the more precisely one knows the position of a particle, the less certain one can be about its momentum and *vice versa*. The same holds true for other pairs of physical properties or complementary variables. This is not down to some human failing or lack of resources it is a fundamental law that can be expressed as an inequality.

$$\sigma_x \sigma_p \geq \frac{\hbar}{2}$$

where σ_x and σ_p are the standard deviations of a particle's position and momentum respectively and \hbar is the reduced Planck's constant equal to 1.05×10^{-34} J.S. Laplace's demon in this sense is only a thought experiment, not one that the actual laws of physics permit.

According to the *Merriam-Webster Dictionary*, the term predeterminism "is also frequently used in the context of biology and hereditary, in which case it represents a form of **biological determinism**". (Wikipedia: Determinism) This is the belief that human and presumably, other organism's behaviour is controlled solely by genes or together with other biological factors. While there is no doubt that a host of phenotypes from eye colour to earlobe attachment are directly determined by heredity, it is unclear whether the same is true of complex behaviours such as sexual orientation, racism or gender roles. Nor is it clear whether, if for example, someone who inherited both copies of all the genes implicated in some complex behaviour, might embrace or disown such behaviour, either through conscious deliberation, socialisation, education or some combination of them.

Fatalism is often mistaken for predeterminism; however according to fate, humans may behave freely but are powerless to direct their future, which has already been determined. In some of the finest Greek tragedies, the gods conspire to spin the fate of the hero, who, do what he may, is ultimately ensnared by his fate. Like an animal caught in a trap, the more he struggles to free himself, the tighter snare closes in upon him. Think of the actions of Oedipus and his parents who tried to avert his fate as a babe by binding his feet and having him exposed on a mountain top. Think also of the shepherd who took pity on him and "rescued" him, all of which ultimately sealed his fate.

Predestination, on the other hand, refers to a kind of fatalism according to which, someone, (usually famous) is thought to have emerged from prior circumstances that somehow assured their destiny. There is, for example, a lot of mythologizing surrounding men (and women) of greatness. According to one recalcitrant myth, it is believed by some, that the humble, rural but royal origins of Nelson Mandela, ensured that he was destined for greatness. True, he *was* a Great Statesman and Humanitarian but this was due to his own tireless efforts and strength of his character as well as

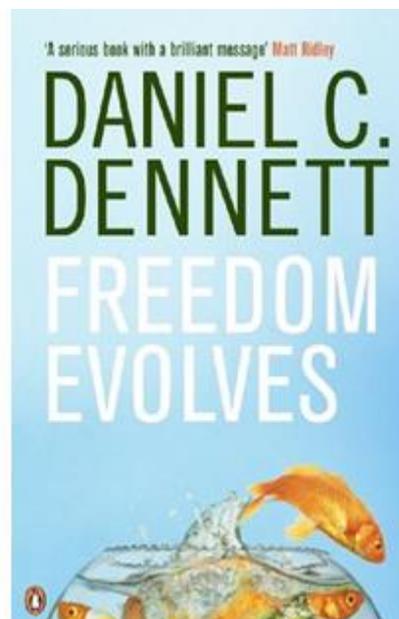
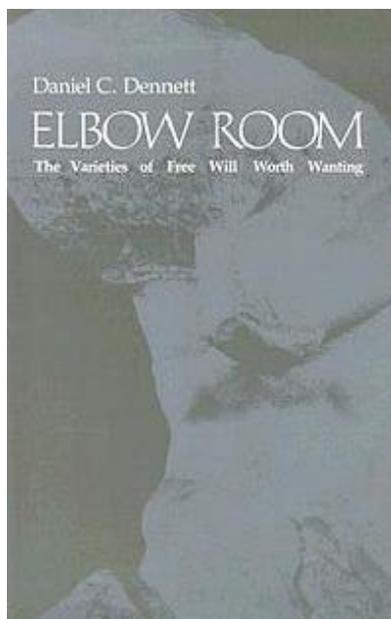
those who mentored him in his youth. Had he (or they) acted in an impatient, weak willed or idle manner he would never have attained greatness.

Theological determinism, which may embrace some or all of the above, in one form or another, is the belief that, since God is both omnipotent and omniscient and created the Universe, he or she already knew at the beginning of time the fate of every single sparrow's fall. (Matthew 10:29) Accordingly, "everything that happens has been predestined to happen by an omniscient, omnipotent divinity". (Pabl Iannone, 2001 p. 194) According to a slightly weaker form of theological determinism: "because God's omniscience is perfect, what God knows about the future will inevitably happen, which means, consequently, that the future is already fixed". (Van Huyssteen, 2003 p. 217)

Various theologians have done cartwheels to reconcile either view with that of human freedom, including treating theological determinism as a species of causal determinism, in which the antecedent conditions for the latter are simply the will of God. (Eshleman, 2009) Whether you are persuaded by such arguments is neither here nor there because it is not logically possible for God to be *both* omniscient *and* omnipotent. Suppose that God grants a miracle to one of his creatures in response to a fervent prayer. "If God is omniscient, he must already know how he is going to intervene to change the course of history using his omnipotence. But that means he can't change his mind about his intervention, which means he is not omnipotent". (Dawkins, 2006 p. 101) Also, somewhat glibly, God cannot do the impossible, such as creating a rock so heavy he could not lift it.

Recommended Reading and Classic Text

Having said what causal determinism is not, the following two books by the same author, Daniel Dennett, are highly recommended both for their philosophical rigor and their popular appeal. Both titles are still in print and available as e-books; however they cannot be reproduced here for copyright reasons. The first, left, is *Elbow Room: The Varieties of Free Will Worth Wanting* (MIT Press 1984) and the second, right is an update to the first: *Freedom Evolves* (Viking Press 2003).



If you are a newcomer to the question of free will and determinism you may want to begin with *Elbow Room* because the more recent *Freedom Evolves* moves at a breakneck pace, often taking in debates that have developed over decades in just a few pages. On the other hand both are very well referenced with annotations and suggestions for further reading at the end of each chapter of *Freedom Evolves*.

Our classic text for this study unit is “Jack” Smart’s astute *Free-Will, Praise and Blame* available [here](#) for free download, as it appeared in the Journal *Mind* (July, 1961).

Libertarianism

What is your position concerning the truth or falsity determinism and free will? If you stopped by for coffee or a muffin this morning on the way to work or lectures you were presumably exercising free will. No one was forcing you into making a decision one way or the other. Indeed, you might simply have decided *not* to have either this morning at all because you were late. On the other hand, you might have made a more complex decision to have a low fat latte and a brisk stroll for a few minutes because; (you told yourself) you need to start eating and exercising smarter.

If ever there were an act of free will, this is surely one of them. If you believe that your choice was not determined entirely by physical states of affairs, you occupy the easily believed, but with a little reflection, untenable position of metaphysical **libertarianism**. One category of libertarians believe that non-physical events within the mind or soul are able to influence or override mere physical causality. According to this view, a person and his cell for cell, molecule for molecule, clone would be free to and indeed could make different choices, when placed in identical situations. Unfortunately, this is simply a statement of belief in an unproven thought experiment, rather than a convincing argument.

The determinist could equally claim that two such clones could not but have chosen the same way, although whether they could be said to choose freely the same way is another matter. The evidence, such as there is, favours the determinist interpretation. We know for instance that the hormones insulin, leptin and ghrelin profoundly regulate the intake of food and that two hypothetically identical individuals would both likely to choose to eat or not eat based solely on their profile of these circulating hormones. The same could be said of salt balance and thirst. Of course, we do not yet know the details of complex choices at the cellular or molecular lever - why one hungry person might opt for a banana rather than blueberry muffin; however that is not to deny that they *are* both physically realised and determined.

The more pressing trouble with libertarianism of this stripe is that it is beset with all the difficulties that dualism has to cope with, chiefly interactionism, the idea that matter and a non-physical mind can exert causal influences on one another. (See Wikipedia: Interactionism (philosophy of mind) and Classic Text 06)

At the other extreme are several theories of physical *indeterminate* libertarianism in which the outcome of a particular choice depends on some random or quantum mechanically described event(s). We will not enter into a discussion of such theories here because a.) if an action were governed by a random occurrence we could not hold such a person morally responsible for an event over which he has no control. I cannot, for example, be held morally responsible for the random decay of a ¹⁴C atom in my head; whereas I can be held morally or legally responsible for a freely chosen decision to obey a certain law or discard it. b.) Quantum mechanically described events are not *indeterminate*; in fact, they are beautifully described by fully deterministic equations, the outcomes of which, when they have been normalised, can only be described statistically.

Two other prominent approaches to libertarianism are those of Robert Nozick (1981) and Robert Kane (1996, 1999 & 2001). We will not discuss them further because Dennett has devoted an entire chapter to “A Hearing for Libertarianism” in his book *Freedom Evolves*.

Indeterminism

Two positions that are diametrically opposite to libertarianism have come to be known as **hard determinism**, according to which we are determined but not free and **hard incompatibilism**, the seldom held view that we are neither determined nor free. According to the **dilemma of determinism**, if the world is strictly deterministic, then we have no free will because our actions were necessitated by past events over which we have no control. On the other hand, if the world is indeterminate, this would mean that our actions would be, at least partly, randomly determined and thus beyond our control, in which case we would not have free will either. (Wikipedia: Free will)

According to Susanne Bobzien (1998 p. 11 ff.) this idea stretches back further than the Stoics and Chrysippus. Although the question was taken up by St. Thomas Aquinas, Hume, Schopenhauer and Nietzsche, the version we shall consider here is a much more recent one. In “Jack” Smart’s *Free-Will, Praise and Blame* (1961, available [here](#)) he proposes two incompatible versions of determinism, D1 and D2, along the lines of Laplace’s demon.

D1. I shall state the view that there is “unbroken causal continuity” in the universe as follows. It is in principle possible to make a sufficiently precise determination of the state of a sufficiently wide region of the universe at time t_0 , and sufficient laws of nature are in principle ascertainable to enable a superhuman calculator to be able to predict any event occurring within that region at an already given time t_1 .

D2. I shall define the view that “pure chance” reigns to some extent within the universe as follows. There are some events that even a superhuman calculator could not predict, however precise his knowledge of however wide a region of the universe at some previous time...

For the believer in free-will holds that *no* theory of a deterministic sort or of a pure chance sort will apply to everything in the universe: he must therefore envisage a theory of a type which is neither deterministic nor indeterministic in the senses of these words which I have specified by the two definitions D1 and D2; and I shall argue that no such theory is possible.

...It is important to distinguish ‘pure chance’ from ‘chance’ or accident. Things may happen by chance or accident in a purely deterministic universe. (More precisely, we can have a use for the words ‘chance’ and ‘accident’ even within a purely deterministic theory.) A man walks along the street and is hit on the head by a falling tile. This is ‘chance’¹ or ‘accident’ in the sense that it is the result of two separate causal chains, the first involving the causes of his walking along just that route at just that time, the second involving the causes of just that tile falling at just that time. There is no law which explains the event in question, as there would have been if the man had just walked under a ladder and if it had been a law of nature that men who walk under ladders get hit on the head by a falling body within the

¹ Cf. Aristotle, *Physics*, 196b-197b.

next thirty seconds. Nevertheless, though the man's being hit on the head is a case of 'chance', Laplace's superhuman calculator could have predicted the occurrence. It is not this sense of 'chance' that I am meaning when I refer to 'pure chance'.

... [I]f there is such a thing as moral responsibility then people's actions must not always be determined in the sense of D1, nor must they happen by pure chance in the sense of D2: they must occur as the result of something else, namely 'contra-causal freedom'.

The difficulty I find in the above conception is as follows. If we accept the definitions D1 and D2, the following propositions are contradictories:

p: This event happened as a result of unbroken causal continuity.

q: This event happened by pure chance.

That is, *q* if and only if not *p*.

But *p* or not *p*.

So *p* or *q*, and not both not *p* and not *q*.

Therefore there is no *third* possibility outside *p* and *q*. What room, then, does logic leave for the concept of 'contra-causal freedom'?

... [T]he precise description of an intermediary possibility... must forever elude us. (p. 293-7)

If you are in any doubt about Smart's inexorable logic you may wish to check his argument by means of a truth table or formal proof. One way or another, we are going to have to accept that determinism is true and that the traditional libertarian conception of freedom is wrong.

Sphexishness

Before we return to the question of freedom, it is instructive to consider a pattern of determined behaviour that we would consider manifestly *unfree*. In his book *Elbow room* Daniel Dennett quotes the following passage by Dean Wooldridge:

When the time comes for egg laying, the wasp *Sphex* builds a burrow for the purpose and seeks a cricket which she stings in such a way as to paralyze but not kill it. She drags the cricket into the burrow, lays her eggs alongside, closes the burrow, then flies away, never to return. In due course, the eggs hatch and the wasp grubs feed off the paralyzed cricket, which has not decayed, having been kept in the wasp equivalent of a deepfreeze. To the human mind, such an elaborately organized and seemingly purposeful routine conveys a convincing flavor of logic and thoughtfulness - until more details are examined. For example, the wasp's routine is to bring the paralyzed cricket to the burrow, leave it on the threshold, go inside to see that all is well, emerge, and then drag the cricket in. If, while the wasp is inside making her preliminary inspection, the cricket is moved a few inches away, the wasp, on emerging from the burrow, will bring the cricket back to the threshold, but not inside, and will then repeat the preparatory procedure of entering the burrow to see that everything is

all right. If again the cricket is removed a few inches while the wasp is inside, once again the wasp will move the cricket up to the threshold and re-enter the burrow for a final check. The wasp never thinks of pulling the cricket straight in. On one occasion this procedure was repeated forty times, always with the same result. (Wooldridge, 1963 pp. 82-83)

Clearly we feel that this creature is governed solely by mindless instinct and is incapable of acting with anything approaching freedom of choice. Indeed, Douglas Hofstadter coined the term **sphexish** to refer to such an unknowing and mechanical form of 'seeming intelligence,' and saw it as "totally opposite to what we feel we are all about, particularly when we talk about our own consciousness". (1985, p. 529)

That the wasp *Sphex ichneumoneus*, just doesn't "get" that it is being manipulated, even after the fortieth time is an anthropomorphism. This insect, which is native to the Western Hemisphere, almost certainly evolved in an environment of evolutionary adaptedness (EEA) that did not involve human interference. Like most of its behavioural repertoire, including that around egg laying time, this would have long ago been laid down as a genetically determined fixed action pattern (FAP) that was and is fit for the purpose of survival and reproduction - the only criteria on which natural selection operates. That a human can reach in a "hijack" such behaviour resulting in seemingly endless rounds of repeated FAPs should be no indictment against natural selection, of which we are also a product.

In a now classic experiment James Olds and Peter Milner (1954) implanted electrodes into the septal area of rat brains which could be stimulated by the rat by pressing a lever. Being part of the "reward system"² of the mammalian brain, the rats in this experiment continued to prefer pressing the lever and thus stimulating this area of their brain, even over sex, food or water. This demonstrates that it is not just insect behaviour that can be "hijacked" in some way to produce sphexish behaviour, but mammals too.

But surely the human nervous system with its transparent consciousness and unimpeded free will to choose how to behave could never be hoodwinked or hijacked in this way, not even by a superhuman intelligence? On the contrary, we have been stimulating the reward system of our own brains with chemical substances including alcohol, cannabinoids, cocaine, nicotine, phencyclidine, opiates, and substituted amphetamines that release the "reward neurotransmitter" dopamine in this area. No tricks or superhuman intelligences are involved. These compounds are freely available in nature, in one form or another, and only need to be isolated, concentrated and ingested, inhaled or injected in sufficient quantities to render us sphexish: without insight or free will to behave as we choose.

What runs through accounts of former addicts such as Melinda Ferguson's *Smacked* (2010) is a succession of "groundhog days" in which every day is a repeated ritual organised around sourcing and consuming their substance of "choice", never pausing to reflect that they might be stuck in some terrifying nightmare. Interestingly, the Afrikaans/Dutch word for "addiction" is *verslaving*: literally "enslavement". If libertarianism were true, there would be no addicts, as nobody wants to be enslaved. We could simply will ourselves out of such situations or "pull ourselves together," as the saying goes. On the other hand, an all-encompassing theory of free will that is not libertarian

² More precisely, the nucleus accumbens in the basal forebrain.

must recognise and accommodate the opposite of human freedom, namely: addiction, enslavement or human selfishness.

The following section describes another approach to freedom which does not deny determinism, but embraces it.

Compatibilism

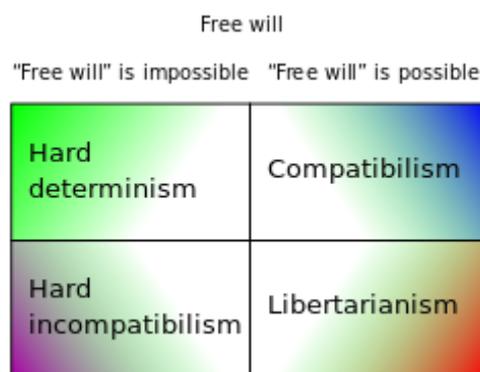
If we construct a 2x2 matrix of positions with regard to determinism and free will then the diagram at right depicts the four possible combinations. As we have seen, via multiple arguments and the empirical evidence of neurobiology and neuropsychology, libertarianism is simply false or at least exceedingly improbable. On the other hand, we know that determinism is without a doubt true. If it were not, none of our hi-tech gadgetry would work or at best would work randomly, not predictably. Nor indeed, would we or life as we know it work: Consider that our DNA replicates faithfully with

“mutation rates as low as 1 mistake per 100 million (10^8) to 1 billion (10^9) nucleotides.” (Pray, 2008) Even then “repair enzymes fix 99% of these lesions for an overall error rate of 10^{-10} per [base pair]. That means one mutation in every 10 billion base pairs that are replicated”. (Moran, 2013) And what of the one in every 10 billion mutations that slip through the net? They are surely down to chance but whether they are down “chance” or “pure chance” as Smart described it hardly seems to matter at such a low rate of mutation. However, because we know the physical mechanisms of many mutagens including certain chemicals, cancerous genes, some viruses, ionising radiation and so on, we are inclined to regard them as a matter of chance, period. Either which way, it seems that both of the bottom two positions in the freedom-determinism matrix are plain wrong or untenable.

That leaves us with a stark choice between **hard determinism**, the view that we are determined and not free, and **compatibilism**, the view that we are determined *and* free. Note however that compatibilism is not simply hard determinism with a dash of libertarianism thrown in - that would invalidate determinism. The “Elbow room” that advocates of compatibilism like Dennett have had to find is a conception of freedom that, paradoxical as it sounds, acknowledges that determinism is true, while allowing us to corral out a series of determined actions that we can meaningfully describe as free.

According to one compatibilist definition of free will, an agent acts freely when he acts according to his own motivation and is not coerced to act or restrained from acting. Schopenhauer (1839) is frequently quoted as saying: Man can do what he wills but he cannot will what he wills. (p. 531)

For some this is a step too far. Surely one of the free choices we would like to be in control of is what we will. If I am on diet, I not only want to avoid eating that calorie rich cupcake, I want to stop wanting it. Similarly consider a smoker, who against his better judgement, lights up anyway. This has



Four Philosophical Positions Regarding Free Will and Determinism (Wikipedia: Free Will)

come to be known as the problem of **weakness of the will** or **akrasia** (from the Greek ἀκρασία, for “lacking command (over oneself)”).

It may be argued that the “will” under compatibilism is depressingly weak because a person could not but make the only *truly* possible decision that he or she could have. (Frankfurt, 1969) However, the only way out for the compatibilist is not to wish for indeterminism but to arrange for *more appropriate* determinism. (See Classic Text 27.) In a sense, the whole purpose of the many years of education we are all required to undergo is to determine that when we make responsible choices we will be strongly determined to make informed and socially desirable choices as opposed to rash or detrimental ones.

Likewise ideally, our legal system ought not to restrain us, although sometimes our baser natures need restraining, but should provide checks and inducements for us to *want* to make choices that are both in our own interests and compatible with those in our society. In other words, a desirable legal system should determine that the expression of our freedom should in no wise diminish or curtail that of others. This is a variety of freedom worth wanting.

There is no doubt, for example that an educated youth in a lawful society has innumerable more avenues of choice available to her than an uneducated counterpart in a state of anarchy. (See Classic Text 05 concerning the State of Nature.) On the other hand, an educational system that promotes rote learning, stifles dissent through the use of propaganda, reduces the number of choices available to its citizens. More worryingly, it reduces the number of choices they would even know to want.

Before we arrive at a statement of a variety of freedom worth wanting, it is instructive to consider the case of Phineas Gage whose ability to choose freely was spared after a terrible accident but whose subsequent choices were seemingly no longer relevant or appropriate to him.

Case Study: Phineas Gage³

Phineas P. Gage (1823 - 1860) was an American railroad construction foreman. His employers described him as a “most efficient and capable foreman... a shrewd, smart business man, very energetic and persistent in executing all his plans of operation”. On 13 September 1848 Gauge was in charge of a gang of workers blasting rock in preparation for a new railway. The task involved boring a deep hole into the outcropping rock, adding blasting powder and a fuse and then sand. Finally the remaining hole was compacted with a tamping rod before lighting the fuse. (Wikipedia: Phineas Gage)

Around 4:30 p.m. on that day, Gauge was compacting a hole for blasting when his tamping iron sparked against the rock and ignited the powder. The resulting blast sent the iron rod airborne, not before entering Gauge’s left hand side face, passing behind the eye and exiting via the top of his skull and landing some 25 meters away. About half an hour later, Dr Edward H. Williams found Gauge sitting on a chair outside the hotel. He resumes the account:

³ The Wikipedia entry: “Phineas Gage” from which this description is liberally borrowed is arguably the most comprehensive, well balanced and well annotated to date. As such it should be the departure point for further reading.

When I drove up he said, "Doctor, here is business enough for you." I first noticed the wound upon the head before I alighted from my carriage, the pulsations of the brain being very distinct. The top of the head appeared somewhat like an inverted funnel, as if some wedge-shaped body had passed from below upward. Mr. Gage, during the time I was examining this wound, was relating the manner in which he was injured to the bystanders. I did not believe Mr. Gage's statement at that time, but thought he was deceived. Mr. Gage persisted in saying that the bar went through his head. Mr. G. got up and vomited; the effort of vomiting pressed out about half a teacupful of the brain, which fell upon the floor.



Phineas Gage with the Inscribed Tamping Iron, his "Constant Companion for the Remainder of his Life"

At around 6 p.m. Dr Harlow took charge of the case:

You will excuse me for remarking here, that the picture presented was, to one unaccustomed to military surgery, truly terrific; but the patient bore his sufferings with the most heroic firmness. He recognized me at once, and said he hoped he was not much hurt. He seemed to be perfectly conscious, but was getting exhausted from the hemorrhage. His person, and the bed on which he was laid, were literally one gore of blood. (Wikipedia: Phineas Gage)

Although the iron took out much of his left frontal lobe, miraculously, he survived - but Gage was no longer Gage. His employers who, before his accident had described him as hard-working, responsible, and "a great favorite" with the men in his charge, and "the most efficient and capable foreman in their employ" afterwards "considered the change in his mind so marked that they could not give him his place again." (Wikipedia: Phineas Gage) Dr Harlow (1868) wrote further:

The equilibrium or balance, so to speak, between his intellectual faculties and animal propensities, seems to have been destroyed. He is fitful, irreverent, indulging at times in the grossest profanity (which was not previously his custom), manifesting but little deference for his fellows, impatient of restraint or advice when it conflicts with his desires, at times pertinaciously obstinate, yet capricious and vacillating, devising many plans of future operations, which are no sooner arranged than they are abandoned in turn for others appearing more feasible. A child in his intellectual capacity and manifestations, he has the animal passions of a strong man. Previous to his injury, although untrained in the schools, he possessed a well-balanced mind, and was looked upon by those who knew him as a shrewd, smart business man, very energetic and persistent in executing all his plans of operation. In this regard his mind was radically changed, so decidedly that his friends and acquaintances said he was "no longer Gage".

Much has been made of this passage (and others concerning Gage) that has been either exaggerated, distorted or pressed into the service of popular and scientific mythology that the Wikipedia article cited devotes two well annotated sections to their debunking. Our purpose in describing this incident and its proximate aftermath is its effect on freedom of choice. If Dr Harlow's account is to be believed, quite early in his recovery, Gage was apparently able to make unrestrained free choices that were simply not relevant to the person he used to be. It was as if, after the accident, he was making (disadvantageous) choices for a different person.

The philosophical point is that a variety of free choice worth wanting is that our choices should not only to be unrestrained but chosen in such a way that they are relevant to who we are. Using Smart's terminology, we want the causal chain of choice to run through our decision making neural apparatus in such a way that they are *for us*, not some other being (or nobody). We want our choices to be *ours* in such a way that we *own* them, not simply that we happen to make them in the way that Gage was seemingly making them in the passage above.

Indeed, Jean-Paul Sartre made much of the distinction between **being-in-itself** (*être-en-soi*) and **being-for-itself** (*être-pour-soi*). The existence of a being-in-itself, such a paper cutter, is self-contained and fully realised with a pre-determined essence (Wikipedia); whereas humans have no such pre-determined essence. Oxford Reference defines being-for-itself as "the mode of existence of consciousness, consisting in its own activity and purposive nature". According to Sartre, we are "condemned to be free". Hence his assertion that, for humans: "existence precedes essence". Without launching into an exposition of Existential Philosophy, we simply wish to observe that the post-accident Gage was seemingly not choosing as a being-for-itself. If anything he was choosing for some other self, not of his former self.

Fortunately for Gage, there was a happier outcome to his middle years in which he regained most of his lost functionality, becoming better socially adapted. Indeed he even found gainful employment as a long-distance stagecoach driver in Chile. In mid-1859 however, after a poor turn in his health, he left Chile for San Francisco where he was cared for by his mother and sister who had relocated there. Having recovered sufficiently, he was employed by a farmer in Santa Clara. On the 21st May 1960 Gage died following a series of seizures and convulsions and was buried in San Francisco's Lone Mountain Cemetery. (Wikipedia: Phineas Gage)

Neuroplasticity

For much of the 20th century students were taught that, following a critical period in childhood, the human brain remains anatomically and functionally static except for the steady loss of neurons over time. We now know this to be untrue: new neurons are produced throughout life in several areas. Synapses are strengthened or weakened in response to increased or decreased activity. Changes in the way ion channels function over time, in axons and dendrites as well as cell bodies, lead to changes in the way they fire and in response to the nature of their inputs. Indeed, so called, dendritic spines are seen to sprout or shrink as they reach out to or loose contact with adjacent axons, providing the anatomical substrate for memory storage, *inter alia*. (Wikipedia: Neuroplasticity; Dendritic spine)

Without neuroplasticity Gage could not have made the remarkable recovery that he did. According to Van Horn *et al.* (2012) the "...damage to Gage's white matter... was as or more significant to Gage's mental changes than cerebral cortex (gray matter) damage". (Wikipedia: Phineas Gage) Besides capillaries, the white matter of our nervous system consists of mostly myelinated cellular projections (mostly axons) connecting various grey matter regions where the cell bodies reside. As such the white matter "actively affects how the brain learns and functions". (Wikipedia: White matter)

The philosophically salient point is that our brains are not static processors in the way that computer processors are. Instead, they are constantly adapting to new situations by sprouting and strengthening new connections while withdrawing or attenuating others, all of which in response to lived perception and behaviour. Thus, the who that we are and the who we choose are not simply a function of our brains, as our brains are also a reciprocal function of our environment and what we perceive and how we choose to act or fail to choose.

A Statement of Human Freedom

The following statement is drawn from considerations presented in this study unit. As such it is a scientifically and philosophically informed belief system or working hypothesis, but not a complete theory or series of theorems. You may or may not agree with it, in part or at all. Indeed, you will be invited to make your own statement concerning human freedom in the task below.

- The world, including us, is deterministic. In so far as it displays indeterminacy at the scale of the very small or quantum level is a function of what we can know, not how things are. The equations describing quantum mechanics are fully deterministic as are those describing Newtonian mechanics at the macroscopic level.
- One cannot be held morally responsible for events that occur either by chance or purely by chance. Praiseworthy or blameworthy actions must be determined by the agent in a way that is neither restrained nor accidental.
- One's philosophical outlook concerning the mind-body problem will largely determine what position one occupies with respect to the question of freedom of will. The facts of the matter however are not determined by personal belief. All indications are that mind-body dualism is false and that some form of physical monism is the correct analysis.
- What one *may* choose or do, is constrained by what one's physical body is *able* to choose or do; therefore the saying that "*ought implies can*" is also applicable to physicalism.
- That one could have done otherwise is not a criterion on freedom of action. If all events leading up to a free choice of one course of action over another were to be reproduced, an individual would still have chosen freely as they did. Contrary to libertarianism, being able to intervene so as to influence or override mere physical causality requires indeterminism. Moreover, the belief that one can or could have done so is an instance of magical thinking.
- Human choice is fallible. It is prone to sphexishness when certain neural circuits, primarily involved in reward and pleasure seeking are short circuited or simulated directly by opiate drugs or functionally similar compounds. The same is true of certain ritualised pleasure seeking, risk taking or self-harming behaviour, which often result in repeated cycles of such conduct without insight or any self-motivated means of quitting.

- The human mind, including its faculty of free choice is function of the physical body. The frontal lobes of the human brain are *inter alia* important in predicting future consequences resulting from current actions and in overriding socially inappropriate responses and in modifying emotions accordingly. They are also important in determining the similarities and differences between things and events. (Wikipedia: Frontal lobe) Therefore, just as the circulation is constrained by the anatomical and functional integrity of the heart and blood vessels, so the ability to choose freely is constrained *inter alia* by the anatomical and functional integrity of the frontal lobes and other structures.
- Assaults, whether chemical, mechanical, or pathological, affecting the neural structures required for free choice will therefore result in pathologies of choice. These include an outright failure of choice in the case of chemical or psychological enslavement or failing to choose socially appropriately or choosing for a self not of oneself.
- Ironically, societies which promote freedom of choice require more determinism (of the right sort) in the form of an extended period of education for all as well as a legal system that restrains behaviour that diminishes the freedoms of others and promotes the freedom of individuals to express themselves without fear, favour or discrimination.
- In short, the traditional philosophical question of freedom vs. determinism should be replaced with one of freedom *and* determinism.

What we have not discussed is the enormous contribution Darwinian thinking has made to the subject of human and other animal freedoms. Dennett's (2003) *Freedom Evolves* has done just that: read it if you can!

We return to the question of freedom *and* determinism in Classic Text 27, where we argue that a compatibilist position is necessary to understand human behaviour through the lens of psychiatry.

Task

Prepare your own "Statement of Human Freedom" after your own fashion. It may be in the form of a mind-map, a flow chart, a key, a model, a manifesto or declaration. It may run contrary to the one above or it might be in broad agreement; however each step, decision node or statement should be justified both by reason and the best available empirical evidence to date. Note: It will be very difficult to persuade someone else of the correctness of your "statement" if do not actually believe it yourself. If, on the other hand, one or more of your beliefs are contradictory or runs contrary to what we know to be the case today, you should consider revising such beliefs, however uncomfortable.

Feedback

Whatever mode of presentation, your "statement" should begin with some elementary true observations and work step-by-step towards some position concerning human freedom *e.g.* libertarianism, hard or soft determinism, or compatibilism. Remember, your presentation should be subservient to your logical process. Similarly, if you start with a position regarding human freedom that you already believe and try to work back, by pressing selective evidence into your preferred

mould, you are unlikely to convince even yourself. Finally, if someone preserves in a philosophical belief in the face of overwhelming scientific evidence to the contrary by insisting, for example, that all of Neuropsychology is just wrong, then he or she has crossed over into the realm of faith.

Perhaps the most difficult notion to unlearn is that freedom and determinism are opposites or incompatible. On the contrary, we have argued that freedom requires the right kind of determinism, so that the causal chain of events leading up to our free choices ultimately passes through our neural choice determining apparatus.

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