Book Synopsis

from Craig Weightman

Determined: A Science of Life Without Free Will

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1: Turtles All the Way Down

Scientific thought has looked at something and tried to determine exactly what caused that something. This is how inventions have worked throughout history. This is how medicine has evolved. This is how we think -- what exactly caused 'that'. When looking at human behavior we use the same logic to determine why we do something. The author has taken this thinking to its logical conclusion. ***We are nothing more or less than the cumulative biological and environmental luck, over which we had no control, that has brought us to any moment***, i.e. there is no such thing as free will *(something coming from nothing)*.

While no single scientific study has ever proved the absence of free will, if knowledge is cumulative, then if you take all the relevant studies together, there is no room for free will to exist. It also seems a fundamental human trait to believe that free will is possible, however, this has no bearing on the possibility of it existing.

Logical implications to having no free will...

- There can be no such thing as blame and punishment as retribution is indefensible.
- It is ok to praise someone as an instrumental intervention, to encourage future behavior, but never because they deserve it, i.e. no one has earned or is entitled to being treated better or worse than anyone else.
- It makes as little sense to hate or love someone as to hate a specific tornado or love a specific lilac.

People believe in free will when it matters. This is a cultural decision, not a scientific one.

- Free will debates often revolve around narrow issues, debated by specialized authorities.
- It is only when you broaden the discussion to generalized behavior can you see where free will may not exist, but...
- Put all the scientific results together, from all the scientific disciplines, and there is no room left for free will; because the disciplines are all inter linked, constituting the same ultimate body of knowledge.

Parts of the book..

1. The first part relies on the above biological framework to reject the concept of free will.
2. The second part examines the implications of there being no free will - as impossible as that is to deal with.

The four flavors of attitudes of people writing about free will

1. The world is deterministic and there is no free will. Determinism is not compatible with free will.
2. The world is deterministic and there is free will. Determinism is compatible with free will.
3. The world is not deterministic and there is no free will. Everything important in the world runs on randomness.
4. The world is not deterministic and there is free will. Determinism and free will are not compatible, but the world is not deterministic.

A related quartet of views regarding free will and moral responsibility

1. There is no free will, and thus holding people morally responsible for their actions is wrong - not related to punishment as a deterrent.
2. There is no free will, but it is ok to hold people morally responsible for their actions. An absence of free will and moral responsibility coexist without invoking the supernatural.
3. There is free will and people should be held morally responsible - most common stance
4. There is free will, but moral responsibility isn't justified - mainly related to execution.

Most people live on a continuum around these poles of free will, determinism, and moral responsibility.

The author's position is, because the world is deterministic, there can't be free will and holding people morally responsible for their actions is not ok.

The most common position is that while the world is deterministic, there is still free will, and holding people morally responsible for their actions is just (called the Compatibility view).

Many papers on the developing science of neuroscience can be summarized by three sentences...

- Wow! There have been all these cool advances in neuroscience, all reinforcing that ours is a deterministic world.
- Some of these findings challenge our notions of agency, moral responsibility, and deservedness so deeply that one must conclude that there is no free will.
- Nah, it still exists.

Definition of free will...

- A neuron (or brain) whose generation of a behavior is independent of the sum of its biological past.

Definition of determinism...

- If we look at two people who have no control over their DNA or background, one a graduating high schooler and the other a service person cleaning up the graduation area, and if we switch the DNA and background between the two people, we accept we would also be switching the person graduating and the person cleaning up.
- Yet rarely do we reflect on why we congratulate the graduate, but move out of the way of the garbage person.

2: The Final Three Minutes of a Movie

The Libet study in 1983 said that we decide what to do before we do it, thus questioning the possibility of free will. The question raised was, 'is there a place in all this where we have a veto power?' Intent being at the heart of the question, because all our criminal law is based on a person having a choice to proceed to commit an act. If we have a choice, then how long before the act would this choice be - i.e. premeditation. The author's point is that all this doesn't matter because intent could be shown to go back millennia.

This Libet study is viewed as the most important study ever done exploring free will, still argued over 40 years later, and it only focuses on the last few seconds of the action, i.e. the final three minutes of a movie.

- Scientific developments often happen because we start to learn more and more about less and less.
- Why would we ignore what came before the present in analyzing someone's behavior? Essentially, because we don't care why someone turned out to be different from us.
- Luck does not average out over time. In fact, bad and good luck are amplified further, based on the person's circumstance (which side of the tracks they are born on). This is not a law, because there are exceptions, but it is a general principle.

3: Where Does Intent Come From?

This chapter shows how you don't ultimately control the intent you form. The intent you form is the result of all the interactions between biology and environment (nature & nurture) that came before. These are all out of your control and there is no point in the sequence where free will could be inserted.

- Seconds to Minutes Before (the first turtle): We are all influenced by our sensory environment - a foul smell, a beautiful face, hunger, a racing heart and these help drive our decisions.
- Minutes to Days Before (the next turtle): Testosterone, oxytocin, and glucercorticoids all have specific effects on the decision we will make. Hormones can change the brain in minutes to hours.
- Weeks to Years Before: Stress, depression, exercise, becoming a father, the bacteria in your gut all can change behaviors over time; influencing which decision you make.

- Back to Adolescence: By early adolescence, the brain is a fairly close approximation of the adult version, except for one region - the frontal cortex - which won't mature for another decade.
  - At the start of adolescence, the frontal cortex has more synapses than in the adult. Adolescence prunes synapses that are superfluous, pokey, or wrong.
  - The frontal cortex, with its roles in executive function, long-term planning, gratification postponement, impulse control, and emotion regulation isn't fully functional in adolescents. Surprise!
  - If the frontal cortex is the last part of the brain to develop, it is least shaped by genes and most shaped by environment. It teaches us things that rely on experience and socialization.
- And Childhood:
  - During childhood we develop reasoning skills, moral decision making, societal reasoning, empathy with both physical and emotional components
  - Things impacting childhood are...
    - Parenting: high demand, high response (authoritative); high demand, low response (authoritarian); low demand, high response (permissive); low demand, low response (negligent)
    - Peer socialization (include teachers in the human equivalent)
    - Environmental influences
    - Cultural beliefs and values
  - How do different childhoods affect different adults?
    - Growing up in a clement/mild climate tends to produce more individualistic, extroverted, open to novel experiences (likely because the world is an easier, safer place to explore).
    - Lots of childhood stress tends to result in adults less adept at impulse control.
    - Lots of early childhood testosterone tends to result in a reactive amygdala equating to a more aggressive response to provocation.
    - How lucky one's childhood was tends to insulate against adult antisocial behavior, poorer health and an earlier death.
  - Luck accumulates (it does not level out) as the better your luck, the more positive attention you get and this functions continuously throughout life.
- Back To The Womb:
  - The biggest influence is what's in the maternal circulation .
    - Lots of glueocortioids results in increased vulnerability to depression and anxiety.
    - Lots of androgens in circulation results in vulnerability to reactive aggression, low empathy, alcoholism, and criminality.
    - Maternal starvation increases the risk of schizophrenia.
- Back To The Beginning: Genes
  - Genes are turned on and off by environment, from a single cell, to hormones, to events happening around us.
  - Only 5% of DNA is genes; the other 95% are the complex on/off switches that influence genes. The more complex the organism, the greater % of DNA is devoted to gene regulation.
  - It is better to ask what a gene does in a particular environment than what it does in isolation. All are managed through the on/off switches.
  - Genes are about potentials and vulnerabilities, not inevitabilities. None the less, all their effects on behavior arise from genes you didn't choose, interacting with a childhood you didn't choose.
- Back Centuries: The Sort of People You Come From
  - What does your culture have to do with the intent you will act upon? Loads & loads
  - Your brain reflects who your ancestors were and historical and ecological circumstances led them to invent those values surrounding you.
    - 'Individualist' vs 'collectivist' cultures
    - rain forest dwellers tended toward polytheistic religions where desert dwellers tended toward monotheistic religions and were more warlike

        - ‘Tight’ cultures have a history of numerous and enforced norms, while ‘loose’ cultures have fewer and less tightly enforced norms. ‘Tight’ cultures have a history of many cultural crises, droughts, famines, earthquakes, and infectious diseases.
    - This does not disprove free will, but finds no place for it to fit in.
- Oh, Why Not Evolution
    - Humans were sculpted by evolution to be more aggressive than bonobos, but less so than chimps; more social than orangutans, but less so than baboons; more monogamous than mouse lemurs, but more polygamous than marmosets.
- Seamless
    - There is no remaining gap between nature and nurture for moral responsibility to fill - Pete Alces.
    - Bad luck doesn’t get evened out by good. It is usually amplified until you are not even on the playing field that needs to be leveled.
    - You became you through many actions that had no place in them for you to act independently.

4: Willing Willpower - The Myth of Grit

In sections 2 & 3 the belief of free will is accomplished by ignoring history, whereas here we address free will outside you. Also, we conclude history is relevant only to some aspects of behavior. In this environment we grow/mature into free will, but cannot identify exactly when this happens.

The Prefrontal Cortex (PFC) is the latest to develop and controls decisions and changes to decisions - new rules. The PFC is responsible for ‘do this’ and ‘don’t do that’, even if the previous is normal behavior. The PFC is the center of our social brains.

- Preceding Seconds to an Hour: The PFC is affected by hunger, stress, and caseload. Therefore, the decisions may have more to do with timing that the facts and emotions.
- Preceding Hours to Days: Hormones impact the PFC, i.e. testosterone, oxytocin, glucrcorticoids, estrogen enhances task switching.
- Preceding Days to Years: Major depression, prolonged stress, alcohol, regular exercise all impact the PFC.
- When you try to do the harder thing that’s better, the PFC is going to be displaying the consequences of whatever the previous years have handed you.

The legacy of adolescence

- During adolescence the PFC is in initial forming stage and doesn’t work as well.
- Conversely, an enriched, stimulating environment during adolescence has great effects on the adult PFC and can reverse some effects of childhood adversity. Prenatal stress causes reductions in BNDF levels and adolescent enrichment can reverse this effect.

The genes you were handed has something to do with the PFC you have. The same gene variant will work differently in different environments.

There is corrolation of gene frequencies, cultural values and child development practices reinforcing each other over generations, shaping what your PFC is going to be like.

Again, the function of the PFC is largely controlled by what happens seconds, minutes, millenia before. There is no room here for free will.

The conclusion here is it is impossible to successfully will yourself to have more willpower.

5: A Primer on Chaos

Chaos theory was introduced in the 1960s, where more than two bodies each impacted each other (sun, moon, earth) and in which an introduced discrepancy cannot be predicted. The only way to determine the outcome is to proceed through the cycle - i.e. not deterministic, no formulas. In the example in the book the author has used Rule 22 of cellular automation, the most commonly used rule to date.

With this evolution of thought, has there been a place for free will to enter the situation? The next five chapters will cover this situation.

6: Is Your Free Will Chaotic?

As chaos theory became more accepted it gained names to describe it, like 'strange attraction' and 'butterfly effect'. These emphasize the lack of ability to predict consequences and should not be mistaken for part of a non-determinate universe.

Two wrong conclusions are often drawn from this condition.

1. The freely choosing cloud: The lack of predictability does not mean something is not deterministic. It is possible to determine how a chaotic event happened, even if it was not predictable. Reasoning backwards again leaves no room for free will in the event. Determinism and predictability are very different things.
2. A causeless fire (if two fires started a third, which is responsible): The phenomenon of convergence, i.e. two different starting states can turn into the identical pattern such that it is not possible to know which of the two was the actual source. Alternative causes, however, still does not allow for the insertion of free will into the situation.

Chaoticism shows the opposite of chaos *(it has unexpectedly detailed structure and determinism)*, it just isn't predictable in the normal manor. This is not a proof of indeterminism, just that we don't yet understand it.

7: A Primer on Emergent Complexity

- From modules to populations of organisms, biological systems generate complexity and optimization that matches what computer scientists, mathematicians, and urban planners achieve.
- These adaptive systems emerge from simple constituent parts having local interactionality, all without central authority.
- These systems have characteristics that exist only at the emergent level and whose behavior can be predicted without having to resort to reductive knowledge about the component parts.
- Not only does this explain emergent complexity in our brains, but our nervous systems use some of the same tricks used by the likes of individual proteins, ant colonies, and slime molds.

Free will is not involved in any of this activity.

8: Does Your Free Will Just Emerge?

Many free-will believers accept that an individual neuron cannot defy the physical universe and have free will. However, a bunch of them can - free-will having as its prerequisite, emergent, higher-level phenomena.

- Problem #1: Rounding techniques may produce 'apparent' similar starting states, but the rounding itself makes them different. Hence, different results from the same starting point (defined as indeterminacy) is a false conclusion. You can't say that two things are the same when they are different, regardless how small.
- Problem #2: The idea that emergence means that the reductive bricks you 'start' with can give rise to emergent states that can then 'do whatever they want' is a false statement. A system is still made up of its constituent parts, with all their mortal limits and foibles.
- Problem #3: The idea that an emergent state can reach down and change the fundamental nature of the bricks comprising it. Emergent states cannot make the bricks that built them stop being brick-ish.

9: A Primer on Quantum Indeterminacy

This chapter examines some foundational domains of the universe in which extremely tiny stuff operates in ways that are not deterministic. Where unpredictability reflects ways in which the physical state of the universe does not determine it. The next chapter (10) is about reining in the free-willers in this playground of indeterminacy.

To summarize, the world is filled with instances of indeterministic Brownian motion, with various biological phenomona having evolved to optimize versions of this randomness. Still no real room for free will.

The concept of quantum indeterminacy destroyed the classical picture of how the world worked, according to Newton.

- Electrons and protons have both a wave and a particle characteristic - a very indeterministic situation. You may know its momentum, but not its location (wave) or you may know its location, but not its momentum (particle).
- Two electrons can become entangled such that when one is altered, the other is also immediately altered. There is no space component, so these electrons can be within the same atom, hundreds of miles apart, or in different solar systems, and action on one immediately impacts the other - no lightspeed limitation.
- Shoot a stream of electrons at a wall and each travels like a wave, superposition dictating that until you measure its location, each electron is probabilistically in numerous places at once. Theoretically it could even be on the other side of the wall - this can happen and is called quantum tunneling.

10: Is Your Free Will Random?

From virtually the first moment this news about the indeterminism in the universe got out, some believers in free will have attributed all sorts of mystical gibberish to quantum mechanics. There are three fatal problems with this attribution.

1. Bubbling up: Electrons at the individual level are capable of indeterminant movement, but their ability to amplify their effects to influence a single molecule or neuron, never mind an entire idea, is far more likely to be washed out over time - effects cancelling each other out in ongoing noise. The bubbling up problem of going from the subatomic level up to brains producing behavior requires a staggeringly large number of such random events occuring at the same time, place, and direction. This is why the weirdness of quantum movement disappears over time. Whatever quantum effects there are in the nervous system, none bubble up to the level telling us anything about someone's actions.
2. Is your free will a smear? If our behavior were rooted in quantum indeterminacy, it wouild be random. How then do we get from randomness to rationality? Even if quantum effects bubbled up enough to make our macro world as indeterministic as our micro one is, this would not be a mechanism for free will worth wanting.
3. Harnessing the randomness of quantum indeterminacy to direct the consistancies of who we are: The whole point of quantum indeterminacy is that such events are not influenced by anything. The only way to overcome this is...
    - ♦ Filtering that allows only some of the randomness that bubbles up. Filtering out nonsense might prevent quantum indeterminacy from generating random behavior, but it certainly isn't a manifestation of free will.
    - ♦ Messing with...where your agentic self reaches down and messes with quantum indeterminacy itself. Messing with does not claim that quantum indeterminacy generates our freely chosen decision for no reason. It claims it does so for magical reasons.

Summary: If determined indeterminism is a valid building block for free will, then that free will is total randomness, not some self-regulated system.

Summary of the last six chapters (5-10). Nonreductionism *(free will)* doesn't mean that there are no component parts. Or that component parts work differently once there are lots of them, or that complex things can fly away untethered from their component parts. A system being unpredictable doesn't mean that it is enchanted.

2nd Part of Book (What do we do with this lack of free will?)

11: Will We Run Amok?

Here is a reason for optimism about how the sky won't necessarily fall if people come to stop believing in free will. Classic studies of the people who risked their lives to save Jews during the Holocaust documented that these people who could not look the other way were disproportionately likely to be either highly religious or highly irreligious, i.e. the people in the middle were the ones taking no action. The similarities between the groups at the extremes are ultimately greater than the differences. Those are also the groups less likely to run amok, with no social compass, should the belief in free will be overturned.

12: The Ancient Gears within Us: How Does Change Happen?

If there is no free will, how does anything ever change? We don't change our minds. Our minds, the end products of all the biological moments that came before, are changed by circumstances all around us.

Circumstances are constantly changing around us, influencing changes to our nervous system. We don't necessarily choose to change, but it is possible for us to be changed, including for the better.

13: We Really Have Done This Before

The last chapter's point was that while change happens, we do not freely choose to change; instead, we are changed by the world around us, and one consequence of that is that we are also changed as to what sources of subsequent change we seek. The purpose of this and the next chapter is that regardless of it seeming unimaginable, we can change in these relms. Time after time we grew to recognize the true causes of something and, in the process, shed hate and blame and desire for retribution. Not only has society not collapsed, but it has gotten better. The following examples show change over centuries and change within our lifetimes.

The falling sickness: Epilepsy afflicts forty million people and kills more than 100,000 per year and is about too much excitation and/or too little inhibition in the nervous system. It is an ancient disease and was originally thought to be caused by phases of the moon or, for most, demonic possession. A passage in the New Testament implies this, linking Christianity to this explanation ever since. With the advance of science and modernity, people began to say, "It's not him. It's his disease." Our approach to the disease has evolved over the centuries and, in more modern societies it is treated as a disease, i.e. people's thoughts and actions have evolved over time - sorta.

People who have seizures and injure others can still be charged with crimes, but it is not automatic. Now we check to see if people have had previous seizures and been warned not to drive before we charge them. If people have done things without taking their medication or gone against doctor's advice, we blame them. How different is this from our earlier discussion about our decisions and our frontal cortex? Where do we measure intent beginning?

This multi century arc of the changing perception of epilepsy is a model for what we have to do going forward. We made major changes in how we perceived this disease to occur - from the devil took possession, to my neurons malfunctioned - and the sky hasn't fallen. However, it isn't enough to know when science began to understand a disease, it's also important to understand when the average person began to understand this was a disease.

Schizophrenia: The disease arises from genetic risk that leaves someone's brain teetering on a cliff, coupled with a stressful environment that then pushes it over the edge. The most reliable chemical result is an excess of the neurotransmitter dopamine. Schizophrenia is a thought disorder of "aberrant salience" which also seems to cause hallucinations. The disease also involves structural changes in the brain, the most dramatic of these being that the cortex is abnormally thin. Someone with schizophrenia has to work harder to pull off the same degree of efficacy at tasks than does someone with a normal frontal cortex. This is a biological problem, not one based in how you were treated. Yet original psychological thought dictated this disease was due to childhood mothering,

having been forcefully modified over psychology's protest over the last 100 years.

Another disease that was first thought to be caused by motherly neglect is *autism*. We now know it to be an alarmingly common neurodevelopmental disorder. Moreover, many with milder versions of autism (used to be called Asperger's syndrome) are now viewed as an extreme in the normal variation in human sociality. With this disease, the anti-vaxxer movement still insists - in the face of every scientific refutation - that autism can be caused by vaccinations gone awry.

Finally, even well after Vietnam, *PTSD* was officially viewed as psychosomatic malingering by most governmental powers and afflicted veterans were often denied health benefits to treat it. Then the usual - genetic links, identification of early developmental neurological issues and types of childhood adversity that increase the risk of succumbing to it, neuroimages showing brain abnormalities - have arisen to change perceptions of the disease being of human treatment origins.

14: The Joy of Punishment

The theme of the second half of this book is, "we've done it before" and the roof has not caved in. But it will be hugely difficult to continue this arc.

While we have moved from public spectacle of torture and punishment to private executions, in an attempt to be more humane, it does seem the human animal gets some type of enjoyment out of inflicting punishment for deeds against our social rules.

Perhaps we will succeed in continuing along the direction we are traveling by treating criminals more humanely and view their deeds as something they truly didn't freely choose to do, but we do still have a long way to go.

15: If You Die Poor

What the science in this book ultimately teaches is that there is no meaning. "This happened because of what came just before, which happened because of what came just before that." There is nothing but an empty, indifferent universe in which, occasionally, atoms come together temporarily to form things we call Me.

People, in general, really don't like the idea of that last paragraph and will fight against it with all they have. One compatibilist philosopher after another reassuringly proclaims their belief in material, deterministic modernity.. .yet somehow, there is still room for free will. A lot of these compatibilists are actually saying that there has to be free will because it would be a total downer otherwise; doing contortions to make an emotional stance seem like an intellectual one.

Chapter 2 discussed a study in which a sense of "illusory will" could be induced in people. One subgroup of subjects, however, was resistant to this - individuals with clinical depression. In some circumstances, depressed individuals may not be distortive, but are "sadder but wiser." As such, depression may be the pathological loss of the capacity to rationalize away reality. And thus, perhaps, "we're better off believing in it anyway."

As we saw in Chapter 11, the theory that we will run amok doesn't hold true. After all, most Americans have been educated to believe in free will and have reflected on how this produces responsibility for our actions. And most have also been taught to believe in a moralizing god, guaranteeing that your actions have consequences. And yet our rates of violence are unmatched in the West. We're doing plenty of running amok as it is. Maybe we should conclude, at least, that rejection of free will is unlikely to make things worse.

Rejecting free will has an additional downside. If there's no free will, you don't deserve praise for your accomplishments, you haven't earned or are entitled to anything. In the author's opinion, it's going to be plenty hard to convince people that a remorseless murder doesn't deserve blame. But that's going to be dwarfed by the difficulty of convincing people that they themselves don't deserve to be praised if they've helped that old woman cross the street.

If there's no place for free will, there is no place for personal meaning or purpose. That's the yawning chasm that haunts philosophers, along with the rest of us. It is logically indefensible, ludicrous, meaningless to believe that something "good" can happen to a machine. Nonetheless, the author is certain that it is good if people feel less pain and more happiness.

However, it's usually good to go with the truth, especially about free will - faith can sustain, but nothing devastates as surely as the discovery that your deeply held faith has been misplaced all along. If we are rational beings, we need to prove it.

Having a neuropsychiatric disorder, having been born into a poor family, having the wrong face or skin color, having the wrong ovaries, loving the wrong gender. Not being smart enough, beautiful enough, successful enough, extroverted enough, lovable enough. Hatred, loathing, disappointment, the have-nots persuaded to believe that they deserve to be where they are because of the blemish on their face or their brain. All wrapped in the lie of a just world.

There is no justifiable "deserve." The only possible moral conclusion is that you are no more entitled to have your needs and desires met than is any other human. This is where science has taken us.

Not everyone agrees; they suggest that we don't know enough yet. But we know that every step higher in an Adverse Childhood Experience score increases the odds of adult antisocial behavior by about 35 percent; given that, we know enough. We know that your life expectancy will vary by thirty years depending on the country you're born in, twenty years depending on the American family into which you happen to be born; we already know enough. And we already know enough, because we understand that the biology of frontocortical function explains why at life's junctures, some people consistently make the wrong decision. We already know enough to understand that the endless people whose lives are less fortunate than ours don't implicitly "deserve" to be invisible.

Those in the future will marvel at what we didn't yet know. They will view us as being as ignorant as we now view the goitered peasants who thought Satan caused seizures. That borders on inevitable. But it need not be inevitable that they also view us as heartless.