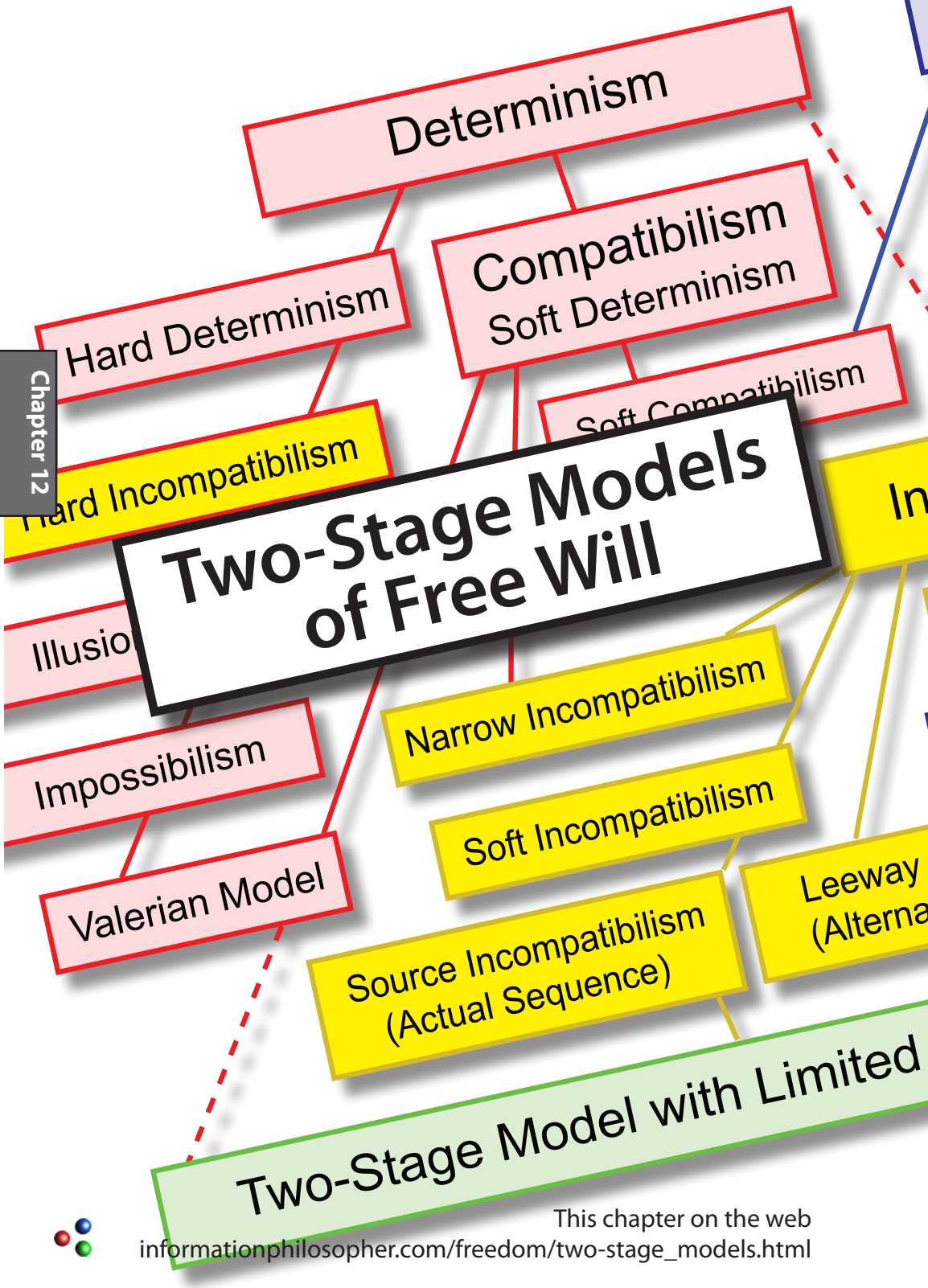
Determinism
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Two-Stage Models
of Free Will
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Source Incompatibilism
(Actual Sequence)
Two-Stage Model with Limited

# Two-Stage Models of Free Will

In our history of the free will problem (Chapter 7), we found several thinkers who developed two-stage solutions to the classical problem of free will, among them William James (1884), Henri Poincaré (about 1906), the physicist Arthur Holly Compton (1931, 1955), the philosopher Mortimer Adler (1961), the mathematician Jacques Hadamard, the philosopher Karl Popper (1965, 1977), the physicist and philosopher Henry Margenau (1968, 1982), the philosophers Daniel Dennett (1978) and Robert Kane (1985), the classicists Anthony Long and David Sedley (1987), Roger Penrose (1989), Julia Annas (1990), Alfred Mele (1995), Benjamin Libet and Stephen Kosslyn (2004), John Searle (2007), and most recently, the neurogeneticist and biologist Martin Heisenberg (2009).

My own **Cogito** two-stage model has been in development since the 1970's, and will be discussed in the next chapter.

## William James (1884)

The genius of the first two-stage model of free will is that James makes **indeterminism** the source for what he calls "**alternative possibilities**" and "ambiguous futures."

The chance generation of such alternative possibilities for action does not in any way limit his choice to one of them. For James, chance is not the direct cause of actions. James makes it clear that it is his choice that "grants consent" to one of them.

As James biographer Robert Richardson puts it,

> "Accepting the possibility of chance does not mean accepting a world that is random. It means realizing that chance is another word for freedom." [1]

In 1884 James asked some Harvard Divinity School students to consider his choice for walking home after his talk.

1 James (2010) p. 21.

> "What is meant by saying that my choice of which way to walk home after the lecture is ambiguous and matter of chance?...It means that both Divinity Avenue and Oxford Street are called but only one, and that one either one, shall be chosen." [2]

With this simple example, James was the first thinker to enunciate clearly a two-stage decision process, with chance in a present time of random alternatives, leading to a choice which grants consent to one possibility and transforms an equivocal ambiguous future into an unalterable and simple past. There is a temporal sequence of undetermined alternative possibilities followed by an adequately determined choice where chance is no longer a factor.



James also asked the students to imagine his actions repeated in exactly the **same circumstances**, a condition which is regarded today as one of the great challenges to libertarian free will. In the following passage, James anticipates much of modern philosophical modal reasoning and physical theories of multiple universes.

> "Imagine that I first walk through Divinity Avenue, and then imagine that the powers governing the universe annihilate ten minutes of time with all that it contained, and set me back at the door of this hall just as I was before the choice was made. Imagine then that, everything else being the same, I now make a different choice and traverse Oxford Street. You, as passive spectators, look on and see the two alternative universes,--one of them with me walking through Divinity Avenue in it, the other with the same me walking through Oxford Street. Now, if you are determinists you believe one of these universes to have been from eternity impossible: you believe it to have been impossible because of the intrinsic irrationality or accidentality somewhere involved in it. But looking outwardly at these universes, can you say which is the impossible and accidental one, and which the rational and necessary one? I doubt if the most ironclad determinist among you could have the slightest glimmer of light on this point." [3]

James's two-stage model effectively separates chance (the indeterministic free element) from choice (an arguably determinate decision that follows causally from one's character, values, and

2 James (1056) "The Dilemma of Determinism," p. 149.
3 *ibid.*, p. 155.

especially feelings and desires at the moment of decision). In his 1890 book *The Principles of Psychology,* James said there were five types of decision. In the first, the reasonable type,

> "arguments for and against a given course seem to settle themselves in the mind and to end by leaving a clear balance in favor of one alternative…. In this easy transition from doubt to assurance we seem to ourselves almost passive; the reasons which decide us appearing to flow in from the nature of things, and to owe nothing to our will. We have, however, a perfect sense of being free, in that we are devoid of any feeling of coercion…. It may be said in general that a great part of every deliberation consists in the turning over of all the possible modes of conceiving the doing or not doing of the act in point. The moment we hit upon a conception which lets us apply some principle of action which is a fixed and stable part of our Ego, our state of doubt is at an end." [4]



Where do the alternative possibilities for action come from? From past experiences - initially involuntary and later from observing the experiences of others, all these the results of chance - we build up a stock of possibilities in our memory.

> "We learn all our possibilities by the way of experience. When a particular movement, having once occurred in a random, reflex, or involuntary way, has left an image of itself in the memory, then the movement can be desired again, proposed as an end, and deliberately willed.
>
> "*A supply of ideas of the various movements that are possible left in the memory by experiences of their involuntary performance is thus the first prerequisite of the voluntary life.*" [5]

In the fifth kind of decision, James sees room for creativity that allows us to do something beyond what the given reasons would logically imply. Note that in a deterministic universe, there are no genuinely new creative acts. Determinism is "information-preserving." There is "nothing new under the sun."

4 James (2007) p. 531
5 James (2007) p. 487-8. The italics are in the original

> "In the fifth and final type of decision, the feeling that the evidence is all in, and that reason has balanced the books, may be either present or absent. But in either case we feel, in deciding, as if we ourselves by our own wilful act inclined the beam; in the former case by adding our living effort to the weight of the logical reason which, taken alone, seems powerless to make the act discharge; in the latter by a kind of creative contribution of something instead of a reason which does a reason's work." [6]

James' "mental evolution" was clearly inspired by Charles Darwin's biological evolution.



> "A remarkable parallel, which I think has never been noticed, obtains between the facts of social evolution on the one hand, and of zoölogical evolution as expounded by Mr. Darwin on the other...
>
> ["In mental evolution], if anywhere, it would seem at first sight as if that school must be right which makes the mind passively plastic, and the environment actively productive of the form and order of its conceptions; which, in a word, thinks that all mental progress must result from a series of adaptive changes, in the sense already defined of that word...It might, accordingly, seem as if there were no room for any agency other than this; as if the distinction we have found so useful between "spontaneous variation," as the producer of changed forms, and the environment, as their preserver and destroyer, did not hold in the case of mental progress; as if, in a word, the parallel with Darwinism might no longer obtain...
>
> "But, in spite of all these facts, I have no hesitation whatever in holding firm to the Darwinian distinction even here...
>
> "And I can easily show...that as a matter of fact the new conceptions, emotions, and active tendencies which evolve are originally produced in the shape of random images, fancies, accidental out-births of spontaneous variation in the functional activity of the excessively instable human brain." [7]

6 James (2007) p. 534.
7 James (1880) p. 441.

## Henri Poincaré (about 1906)

Henri Poincaré was called the "last universalist" because he was a great contributor to so many fields in mathematics, but his work was also broad in physics, philosophy, and psychology. William James read Poincaré and the great thinker knew James work. There is some sign of direct influence.

Poincaré speculated on how his mind works when he is solving mathematical problems. He had the critical insight that random combinations and possibilities are generated, some in an unconscious way with chance involved, then they are selected among, perhaps initially also by an unconscious process, but then by a definite conscious process of validation.

> "It is certain that the combinations which present themselves to the mind in a kind of sudden illumination after a somewhat prolonged period of unconscious work are generally useful and fruitful combinations… all the combinations are formed as a result of the automatic action of the subliminal ego, but those only which are interesting find their way into the field of consciousness… A few only are harmonious, and consequently at once useful and beautiful, and they will be capable of affecting the geometrician's special sensibility I have been speaking of; which, once aroused, will direct our attention upon them, and will thus give them the opportunity of becoming conscious… In the subliminal ego, on the contrary, there reigns what I would call liberty, if one could give this name to the mere absence of discipline and to disorder born of chance." [8]

Poincaré was thus the second thinker to propose the two-stage process of random alternatives followed by selection of one choice.

## Jacques Hadamard (1945)

In his 1945 book *Psychology of Invention in the Mathematical Field*, Hadamard described the Synthèse conference in Paris in 1936 organized to study creativity. The conference focused on Henri Poincare's two-stage approach to problem solving, in which the unconscious generates random combinations. In his book, Hadamard quoted the poet Valéry (as did Dennett later),

8 Poincaré (2003)



summarizing the conference opinion. For Hadamard, it captured Poincaré's description of how the combination of random ideas is followed by a choice of the best combination. Chance alone is not enough.

> "...it is obvious that invention or discovery, be it in mathematics or anywhere else, takes place by combining ideas.
>
> "However, to find these, it has been necessary to construct the very numerous possible combinations, among which the useful ones are to be found.
>
> "It cannot be avoided that this first operation take place, to a certain extent, at random, so that the role of chance is hardly doubtful in this first step of the mental process.
>
> "It is obvious that this first process, this building up of numerous combinations, is only the beginning of creation, even, as we should say, preliminary to it...Invention is discernment, choice.
>
> "*To Invent Is to Choose.* This very remarkable conclusion appears the more striking if we compare it with what Paul Valéry writes in the Nouvelle Revue Française: "It takes two to invent anything. The one makes up combinations; the other one chooses, recognizes what he wishes and what is important to him in the mass of the things which the former has imparted to him."
>
> "What we call genius is much less the work of the first one than the readiness of the second one to grasp the value of what has been laid before him and to choose it." [9]

Although Valéry describes two persons, this is clearly William James' temporal sequence of random chance ("free") followed by a determining choice ("will"). For James, chance and choice are part of a single mind.

## Arthur Holly Compton (1931, 1955)

In 1931, Nobel prize-winning physicist Compton championed the idea of human freedom based on quantum uncertainty and invented the notion of amplification of microscopic quantum events to bring chance into the macroscopic world. In his rather

9 Hadamard (1945) p. 30.



bizarre mechanism, he imagined sticks of dynamite attached to his amplifier, anticipating the Schrödinger's Cat paradox.

Years later, Compton clarified the two-stage nature of his idea in an *Atlantic Monthly* article in 1955.

> "A set of known physical conditions is not adequate to specify precisely what a forthcoming event will be. These conditions, insofar as they can be known, define instead a range of possible events from among which some particular event will occur. When one exercises freedom, by his act of choice he is himself adding a factor not supplied by the physical conditions and is thus himself determining what will occur. That he does so is known only to the person himself. From the outside one can see in his act only the working of physical law. It is the inner knowledge that he is in fact doing what he intends to do that tells the actor himself that he is free." [10]



## Mortimer Adler (1961)

In the second volume of his massive book *The Idea of Freedom*, Adler revisits the idea of a natural freedom of self-determination, which explicitly includes **alternative possibilities** and the self as a cause so our actions are "**up to us**." Note that the uncaused self decides from prior alternative possibilities.

"We have employed the following descriptive formula to summarize the understanding of self-determination." It is "only when at least two of the three following points are affirmed:

"(i) that the decision is intrinsically unpredictable, i.e., given perfect knowledge of all relevant causes, the decision cannot be foreseen or predicted with certitude;

"(ii) that the decision is not necessitated, i.e., the decision is always one of a number of alternative possible decisions any one of which it was simultaneously within the power of the self to cause, no matter what other antecedent or concurrent factors exercise a causal influence on the making of the decision;

"(iii) that the decision flows from the causal initiative of the self, i.e., on the plane of natural or finite causes, the self is the uncaused cause of the decision it makes." [11]

10 Compton (1967)
11 Adler (1961) p. 225.

## Karl Popper (1965, 1977)

Compton's work was no doubt closely read by philosopher Karl Popper, especially when Popper was selected to give the first Arthur Holly Compton Memorial Lecture in 1965.

At first Popper dismissed quantum mechanics as being no help with free will, but later he describes a **two-stage model** that parallels Darwinian evolution, with genetic mutations being probabilistic and involving quantum uncertainty. In his Compton lectures, he criticizes Compton's amplifier idea

> "The idea that the only alternative to determinism is just sheer chance was taken over by Schlick, together with many of his views on the subject, from Hume, who asserted that
>
> > 'the removal' of what he called 'physical necessity' must always result in 'the same thing with chance. As objects must either be conjoin'd or not, . . . 'tis impossible to admit of any medium betwixt chance and an absolute necessity'.
>
> "I shall later argue against this important doctrine according to which the alternative to determinism is sheer chance. Yet I must admit that the doctrine seems to hold good for the quantum-theoretical models which have been designed to explain, or at least to illustrate, the possibility of human freedom. This seems to be the reason why these models are so very unsatisfactory.
>
> "Compton himself designed such a model, though he did not particularly like it. It uses quantum indeterminacy, and the unpredictability of a quantum jump, as a model of a human decision of great moment. It consists of an amplifier which amplifies the effect of a single quantum jump in such a way that it may either cause an explosion or destroy the relay necessary for bringing the explosion about. In this way one single quantum jump may be equivalent to a major decision. But in my opinion the model has no similarity to any rational decision, being probabilistic and involving quantum uncertainty.
>
> "Hume's and Schlick's ontological thesis that there cannot exist anything intermediate between chance and determinism seems to me not only highly dogmatic (not to say doctrinaire) but clearly absurd; and it is understandable only on the assumption



> that they believed in a complete determinism in which chance has no status except as a symptom of our ignorance." [12]

Popper called for a combination of randomness and control to explain freedom, though not yet explicitly in two stages with random chance before the controlled decision.

> "freedom is not just chance but, rather, the result of a subtle interplay between something almost random or haphazard, and something like a restrictive or selective control." [13]

In his 1977 book with John Eccles, *The Self and its Brain*, Popper finally formulates the two-stage model in a temporal sequence, and makes the comparison with evolution and natural selection,

> "New ideas have a striking similarity to genetic mutations. Now, let us look for a moment at genetic mutations. Mutations are, it seems, brought about by quantum theoretical indeterminacy (including radiation effects). Accordingly, they are also probabilistic and not in themselves originally selected or adequate, but on them there subsequently operates natural selection which eliminates inappropriate mutations. Now we could conceive of a similar process with respect to new ideas and to free-will decisions, and similar things.
>
> "That is to say, a range of possibilities is brought about by a probabilistic and quantum mechanically characterized set of proposals, as it were - of possibilities brought forward by the brain. On these there then operates a kind of selective procedure which eliminates those proposals and those possibilities which are not acceptable to the mind."

In 1977 Popper gave the first Darwin Lecture, at Darwin College, Cambridge. He called it *Natural Selection and the Emergence of Mind*. In it he said he had changed his mind (a rare admission by a philosopher) about two things. First he now thought that natural selection was not a "tautology" that made it an unfalsifiable theory. Second, he had come to accept the random variation and selection of ideas as a model of free will.

> "The selection of a kind of behavior out of a randomly offered repertoire may be an act of choice, even an act of free will. I am

12 Popper (1972) p. 227ff..
13 *ibid.*



an indeterminist; and in discussing indeterminism I have often regretfully pointed out that quantum indeterminacy does not seem to help us;[1] for the amplification of something like, say, radioactive disintegration processes would not lead to human action or even animal action, but only to random movements.

"I have changed my mind on this issue.[2] A choice process may be a selection process, and the selection may be from some repertoire of random events, without being random in its turn. This seems to me to offer a promising solution to one of our most vexing problems, and one by downward causation."

1. Cf. my Objective Knowledge, chapter 6, pp. 226-29.
2. See p. 540 of J. C. Eccles and K. R. Popper, The Self and Its Brain.



## Henry Margenau (1968, 1982)

In 1968, physicist Margenau was invited to give the Wimmer Lecture at St. Vincent College in Pennsylvania. His topic was *Scientific Indeterminism and Human Freedom*. Margenau embraced indeterminism as the first step toward a solution of the problem of human freedom.

Then in 1982, with co-author Lawrence LeShan, Margenau called his model of free will a "solution" to what had heretofore had been seen as mere "paradox and illusion." He very neatly separates "free" and "will" in a temporal sequence, as William James had done, naming them simply "chance" followed by "choice."

"Our thesis is that quantum mechanics leaves our body, our brain, at any moment in a state with numerous (because of its complexity we might say innumerable) possible futures, each with a predetermined probability. Freedom involves two components: chance (existence of a genuine set of alternatives) and choice. Quantum mechanics provides the chance, and we shall argue that only the mind can make the choice by selecting (not energetically enforcing) among the possible future courses." [14]

## Daniel Dennett (1978)

While he is a confirmed compatibilist, in "On Giving Libertarians What They Say They Want," chapter 15 of his 1978 book

14 Margenau and Leshan (1982) p. 240.

*Brainstorms*, Tufts philosopher Daniel Dennett articulated the case for a two-stage model of free will better than any libertarian.

Dennett named his model of decision-making "Valerian" after the poet Paul Valéry, who took part in a 1936 conference in Paris with Jacques Hadamard. He quotes Valéry,

> "It takes two to invent anything. The one makes up combinations; the other one chooses." [15]

Dennett makes his version of a two-stage model very clear. And he defends it with six excellent reasons. His arguments are more persuasive than any other philosopher or scientist, including William James himself. Ironically, Dennett remains a firm believer in determinism and calls himself a compatibilist.

> "The model of decision making I am proposing has the following feature: when we are faced with an important decision, a consideration-generator whose output is to some degree undetermined produces a series of considerations, some of which may of course be immediately rejected as irrelevant by the agent (consciously or unconsciously). Those considerations that are selected by the agent as having a more than negligible bearing on the decision then figure in a reasoning process, and if the agent is in the main reasonable, those considerations ultimately serve as predictors and explicators of the agent's final decision."[16]

Dennett gives strong reasons why this is the kind of free will that libertarians say they want.

> 1. "First...The intelligent selection, rejection, and weighing of the considerations that do occur to the subject is a matter of intelligence making the difference."
>
> 2. "Second, I think it installs indeterminism in the right place for the libertarian, if there is a right place at all."
>
> 3. "Third...from the point of view of biological engineering, it is just more efficient and in the end more rational that decision making should occur in this way."

15 Dennett (1978) p. 293
16 Dennett (1978) p. 295



4. "A fourth observation in favor of the model is that it permits moral education to make a difference, without making all of the difference."

5. "Fifth - and I think this is perhaps the most important thing to be said in favor of this model - it provides some account of our important intuition that we are the authors of our moral decisions."

6. "Finally, the model I propose points to the multiplicity of decisions that encircle our moral decisions and suggests that in many cases our ultimate decision as to which way to act is less important phenomenologically as a contributor to our sense of free will than the prior decisions affecting our deliberation process itself: the decision, for instance, not to consider any further, to terminate deliberation; or the decision to ignore certain lines of inquiry.

"These prior and subsidiary decisions contribute, I think, to our sense of ourselves as responsible free agents, roughly in the following way: I am faced with an important decision to make, and after a certain amount of deliberation, I say to myself: "That's enough. I've considered this matter enough and now I'm going to act," in the full knowledge that I could have considered further, in the full knowledge that the eventualities may prove that I decided in error, but with the acceptance of responsibility in any case." [17]

## Robert Kane (1985)

In his 1985 book *Free Will and Values* Kane carefully considered the work of Compton, Popper, Eccles, and Dennett. He says he developed his own two-stage model before Dennett, but in the end he did not publish it or endorse Dennett because the two-stage model "did not go far enough."

Kane was actually quite bleak about the possibilities for a satisfactory libertarian model. He felt,

> "that any construction which escaped confusion and emptiness was likely to fall short of some libertarian aspirations - aspirations that I believe cannot ultimately be fulfilled." [18]

17 Dennett (1978) p. 295-7.
18 Kane (1985) p. 165.

His first model was a choice between "relativistic alternatives." The choice was in part rational and in part indeterministic. It could be explained by the agent giving his reasons. Even if the choice is by chance,

> "the agent has agreed beforehand to accept the chance selected outcome and to endorse reasons for it in a special way. That is, the selection is going to be 'willed to be so' on a provisional basis by the agent, whichever way it goes." [19]

Kane hoped to combine some rationality with some freedom in this model, so both determinists and libertarians would be happy. Unfortunately, neither was happy.

Although the two-stage model of earlier thinkers is an "essential and important part" of any adequate libertarian conception of free will, it does not go far enough for Kane because it does not fully capture the notion of ultimate responsibility (UR) during "self-forming actions" (SFAs) which depend on the agent's efforts. He has said that the two-stage model was merely a "significant piece in the overall puzzle of a libertarian freedom." [20]

> "The reason is that the chance ("free") part is not in the control of the agent and the "will" part is fully determined by a combination of the chance part and other determining factors, so the final choice is determined by factors, none of which the agent has control over at the time of choice. If all of our choices are determined at the time of choice that would not be libertarian freedom even if some chance events in the past were responsible for forming some of the determining factors that now determine our choice because however the determining factors were formed in the past, all of our choices would be determined when they are made." [21]

Kane agrees that these choices would not have been **predetermined** from before the chance events in the past (the generation of possibilities in the first stage), so are libertarian free.

Kane had previously accepted that the two-stage model could provide enough freedom for everyday practical decisions (vanilla or chocolate), but did not play a role in moral or prudential "torn"

19 Kane (1985) p. 96.
20 Kane (1985) p. 104.
21 Personal communication.



decisions between what the agent believes ought to be done and what the agent wants or desires to do.

Today Kane sees that two-stage models may generate the alternatives of his SFAs, based on character and motives. So they may explain the agent's conflicting motives in moral and prudential choices. and they even explain the (reasons for the) agent's efforts. Kane now agrees that the agent has libertarian freedom even when the two-stage model produces just one option and the agent can be described as "self-determined."

But when the two-stage model does not narrow down the alternatives to a single act of **self-determination**, and when the choice is moral or prudential, Kane says that his introduction of indeterminism into the decision itself provides "something more" than the two-stage model, and I now agree with him.



> "Now I believe these undetermined self-forming actions or SFAs occur at those difficult times of life when we are torn between competing visions of what we should do or become. Perhaps we are torn between doing the moral thing or acting from ambition, or between powerful present desires and long-term goals, or we are faced with difficult tasks for which we have aversions." [22]

> "In all such cases, we are faced with competing motivations and have to make an effort to overcome temptation to do something else we also strongly want. There is tension and uncertainty in our minds about what to do at such times, I suggest, that is reflected in appropriate regions of our brains by movement away from thermodynamic equilibrium — in short, a kind of "stirring up of chaos" in the brain that makes it sensitive to micro-indeterminacies at the neuronal level. The uncertainty and inner tension we feel at such soul-searching moments of self-formation is thus reflected in the indeterminacy of our neural processes themselves. What we experience internally as uncertainty about what to do on such occasions would then correspond physically to the opening of a window of opportunity that temporarily screens off complete determination by influences of the past. [23]

22 "Libertarianism," in Fischer (2007) p. 26.
23 *ibid*. p. 26.

Kane agrees that the ever-present noise in the brain is enough to provide the indeterminism. But he emphasizes that the agent's efforts are more the cause of the final decision than the indeterminism involved.

> "If indeterminism is involved in a process so that its outcome is undetermined, one might argue that the outcome must merely happen and therefore cannot be somebody's choice. But there is no reason to assume such a claim is true. A choice is the formation of an intention or purpose to do something. It resolves uncertainty and indecision in the mind about what to do. Nothing in such a description implies that there could not be some indeterminism in the deliberation and neural processes of an agent preceding choice corresponding to the agent's prior uncertainty about what to do. Recall from the preceding arguments that the presence of indeterminism does not mean the outcome happened merely by chance and not by the agent's effort. Self-forming choices are undetermined, but not uncaused. They are caused by the agent's efforts. [24]

To Kane's critics, the SFA's indeterminism raises the objection of loss of control, but Kane says the agent can decide to assume responsibility whichever way she chooses.

> "Suppose we were to say to such persons: 'But look, you didn't have sufficient or conclusive prior reasons for choosing as you did since you also had viable reasons for choosing the other way.' They might reply. 'True enough. But I did have good reasons for choosing as I did, which I'm willing to stand by and take responsibility for. If these reasons were not sufficient or conclusive reasons, that's because, like the heroine of the novel, I was not a fully formed person before I chose (and still am not, for that matter). Like the author of the novel, I am in the process of writing an unfinished story and forming an unfinished character who, in my case, is myself.'" [25]

## Anthony Long and David Sedley (1987)

Anthony Long and David Sedley speculated in their masterwork *The Hellenistic Philosophers* that Epicurus' swerve of the

24 "Libertarianism," in Fischer (2007) p. 33
25 *ibid*, pp. 41-2.



atoms might be limited to providing undetermined **alternative possibilities** for action, from which the mind's power of volition could choose in a way that reflects character and values, desires and feelings.

> "Here at last a significant role for the swerve leaps to the eye. For it is to answer just this question, according to Cicero, that the swerve was introduced. The evident power of the self and its volitions to intervene in the physical processes of soul and body would be inexplicable if physical laws alone were sufficient to determine the precise trajectory of every atom. Therefore physical laws are not sufficient to determine the precise trajectory of every atom. There is a minimal degree of physical indeterminism — the swerve. An unimpeded atom may at any given moment continue its present trajectory, but equally may `swerve' into one of the adjacent parallel trajectories. [26]

Long and Sedley assume a non-physical (metaphysical) ability of the volition to affect the atoms, which is implausible. But the idea that a physical volition chooses - (consistent with and adequately determined by its character and values and its desires and feelings) from among alternative possibilities provided randomly by the atoms - is quite plausible.

> "It does so, we may speculate, not by overriding the laws of physics, but by choosing between the alternative possibilities which the laws of physics leave open. In this way a large group of soul atoms might simultaneously be diverted into a new pattern of motion, and thus radically redirect the motion of the body. Such an event, requiring as it does the coincidence of numerous swerves, would be statistically most improbable according to the laws of physics alone. But it is still, on the swerve theory, an intrinsically possible one, which volition might therefore be held to bring about..(It may be objected that swerves are meant to be entirely uncaused; but...that was only an inference by Epicurus' critics, made plausible by concentrating on the swerve's cosmogonic function...for there it must indeed occur at random and without the intervention of volition.)" [27]

26 Long and Sedley (1987) p. 110.
27 Long and Sedley (1987) p. 110.

## Roger Penrose (1989)

In his 1989 book The Emperor's New Mind, Penrose suggests a two-stage process but is skeptical of the value of randomness in the first step. His thinking follows that of Jacques Hadamard and Henri Poincaré, who he has discussed in the previous pages.

> "In relation to this, the question of what constitutes genuine originality should be raised. It seems to me that there are two factors involved, namely a 'putting-up' and a 'shooting-down' process. I imagine that the putting-up could be largely unconscious and the shooting-down largely conscious. Without an effective putting-up process, one would have no new ideas at all. But, just by itself, this procedure would have little value. One needs an effective procedure for forming judgements, so that only those ideas with a reasonable chance of success will survive. In dreams, for example, unusual ideas may easily come to mind, but only very rarely do they survive the critical judgements of the wakeful consciousness. In my opinion, it is the conscious shooting-down (judgement) process that is central to the issue of originality, rather than the unconscious putting-up process; but I am aware that many others might hold to a contrary view." [28]

## Julia Annas (1992)

In her 1992 book, *The Hellenistic Philosophy of Mind*, Annas finds it hard to see how random swerves can help to explain free action. But she sees clearly that randomness can provide alternative possibilities for the will to choose from. She says, "there would be no point in having free will if there were no genuinely open possibilities between which to select," anticipating the two-stage model of free will.

Perhaps influenced by her classicist colleagues Sedley and Long, or maybe just coming to the same conclusions from reading the ancients, especially Epicurus and his swerve, Annas says.

> "...since swerves are random, it is hard to see how they help to explain free action. We can scarcely expect there to be a random swerve before every free action...random swerves would seem

28 Penrose (1989) p. 422.



to produce, if anything, random actions; we still lack any clue as to how they could produce actions which are free.

"An influential modern line of thought avoids these problems by arguing that our evidence does not demand that there be a swerve for each free action [Furley]. Rather, swerves explain the fact that people have characters capable of change and reaction that goes beyond mechanical response to stimuli. We act freely because we have characters that are flexible and spontaneous, and this is because we are composed of atoms which swerve occasionally. On this account, swerves do not have to be frequent, since they are not part of any mechanism of action; one swerve in your soul is enough for the kind of character flexibility that is required. Such an account avoids the problems attaching to any account that brings swerves into free action, but at the cost of not answering very closely to the evidence; the Lucretius passage certainly suggests that swerves are in some way relevant at the point of action.

"Another kind of suggestion is that swerves are not the causes of free actions at all. Rather, they come into the process whereby free actions are brought about. Swerves are supposed to explain something about the nature of free agency and how it works, but they do not cause free actions (by cutting across causal chains, for example). This suggestion can be developed in several ways...

"The role of swerves is to provide alternative possibilities for volitions to choose between, for there would be no point in having free will if there were no genuinely open possibilities between which to select." [29]

## Albert Mele (1995)

In 1995 Alfred Mele, clearly influenced by Daniel Dennett and Robert Kane, proposed his "Modest Libertarianism," a two-stage process that combines an incompatibilist early phase followed by a compatibilist control phase.

"it might be worth exploring the possibility of combining a compatibilist conception of the later parts of a process issuing in full blown, deliberative, intentional action with an incom-

29 *The Hellenistic Philosophy of Mind*, pp. 184-88

> patibilist conception of the earlier parts. For example, it might be possible to gain "ultimate control" while preserving a considerable measure of nonultimate agential control by treating the process from proximal decisive better judgment through overt action in a compatibilist way and finding a theoretically useful place for indeterminacy in processes leading to proximal decisive better judgments." [30]

Mele sees that chance need not be the direct cause of action.

> "That a consideration is indeterministically caused to come to mind does not entail that the agent has no control over how he responds to it." [31]

Mele is very concerned about the location of any indeterminism, the problem of where and when indeterminism could occur in a way that helps and does not harm agent control.



### The Problem of Luck

Mele has written extensively about the question whether chance events in our causal history mean that many of our actions are a matter of luck. Since chance is very real, many things are the result of good or bad luck. This is a not a problem for free will, but it is one for **moral responsibility**.

## John Martin Fischer (1995)

Also in 1995, John Martin Fischer argued for a model based on Daniel Dennett's 1978 work. Fischer is best known for the idea of **semicompatibilism**, the idea that moral responsibility is compatible with determinism. Fischer is agnostic on whether free will itself is compatible or incompatible with determinism.

Fischer is most concerned to establish the control needed for responsibility, especially given Frankfurt-style examples challenging control. In any case, Fischer uses the Dennett idea - that the indeterminism comes at an early stage of the overall deliberation-decision process - to locate a Frankfurt-style "prior sign" needed by the hypothetical intervener at a place deterministically linked to the decision and subsequent action.

30 Mele (1995) p. 212.
31 Mele (2006) p. 10..

Fischer's main criticism of alternative possibilities for action is that it is implausible to suppose that one's **moral responsibility** is grounded on the possibility of forming a certain sort of judgment about what is best: a judgment on behalf of doing something there are no good reasons to do. The responsibility for doing good is not grounded in the possibility of doing bad. Note that free will is completely independent of, and merely a prerequisite to, **moral responsibility**. Otherwise it would be an ethical fallacy.

Fischer hopes to develop "another sort of libertarianism." He says he does not have the space to lay out his "second family of libertarian accounts," and gives us very little on how it differs from Dennett. He says "Dennett argues that it is the only sort of libertarianism that is plausible, and I believe that it is at least minimally plausible. I also believe that it is libertarianism." Fischer may be simply constructing a libertarianism with a built-in place for the Frankfurt intervener, in order to support the absence of **alternative possibilities** and his own **semicompatibilism**. Here is Fischer's sketch of his main idea.

> "I wish to develop (in an extremely sketchy way) another sort of libertarianism; on this kind of approach, the relationship between the relevant "sign" or "signal" and the subsequent choice is causally deterministic, but there is nevertheless a lack of causal determination along the sequence that issues in the decision (and action). And I shall point out that this approach also seems to lead to the view that an agent can be morally responsible for making a choice even though he could not have (at any relevant time) made a different choice.
>
> "I do not have the space here to lay out this second family of libertarian accounts fully or carefully. But I shall simply sketch the main ideas and hope that enough of the content of the approach will emerge to convince the reader that this family of views constitutes a minimally plausible, serious libertarian approach - worth further elaboration and evaluation in the context of the issues under discussion here. In his article, "On Giving Libertarians What They Say They Want," Daniel Dennett has presented this family of approaches; he does not necessarily

endorse the view, but presents it as the most plausible and appealing version of libertarianism.

"What is crucial to Dennett's view is that indeterminacy be installed at the appropriate place, and Dennett argues that this is not between the judgment that a particular act is the best among one's alternatives and the subsequent choice. He says, "Clearly, what the libertarian has in mind is indeterminism at some earlier point, prior to the ultimate decision or formation of intention...." Rather, Dennett argues that there can be lack of causal determinism (of a certain sort) within the process of deliberation that leads to the agent's judgment as to what is the best option (under the circumstances).

"So Dennett's picture suggested on behalf of the libertarian involves some lack of causal determination in the process of deliberation, but no such lack in the link between the judgment as to what is best and the formation of an intention (or the making of a decision). Let me emphasize that I am not in a position here fully to lay out this view (or set of views) or to defend it. Dennett argues that it is the only sort of libertarianism that is plausible, and I believe that it is at least minimally plausible. I also believe that it is libertarianism." [32]



## Benjamin Libet and Stephen Kosslyn (2004)

In 2004, Stephen Kosslyn wrote a foreword to Benjamin Libet's book *Mind Time*. The book summarized Libet's famous experiments, in which he claimed a Readiness Potential (RP) *initiates* an action well before the conscious will is aware of the decision to act. See Chapter 17 for the details. At one point in the book, Libet suggests the RP might include multiple initiatives, implying multiple possible alternative actions. [33]

In a few brief paragraphs of the foreword, Kosslyn proposed a two-stage model of alternative choices that are constructed in part chaotically by nondeterministic processes, followed by decisions that are based on our character and values - "what one is." He sees a role for a *causa sui*.

32 Fischer (1995) p. 125
33 Libet (2004), p. 148.

> "The rationales and anticipated consequences — and even, depending on the situation, the alternative courses of action — are not simply "looked up" in memory, having been stashed away like notes in a file after previous encounters.

Here Kosslyn considers a first stage of free creation of alternative courses of action,

> "Rather, one constructs rationales and anticipated consequences, as appropriate for the specific situation at hand. This construction process may rely in part on chaotic processes. Such processes are not entirely determined by one's learning history (even as filtered by one's genes)... Depending on what one was just thinking about, the brain is in a different "start state" (i.e., different information is partially activated, different associations are primed) when one constructs rationales and anticipated consequences — which will affect how one decides. (Note that this idea does not simply move the problem back a step: What one was just thinking itself was in part a result of nondeterministic processes.) Our thoughts, feelings and behavior are not determined; we can have novel insights as well as "second thoughts."

> "Given the choices, rationales, and anticipated consequences, one decides what do on the basis of "what one is" (mentally speaking, to use [Galen] Strawson's term, which includes one's knowledge, goals, values, and beliefs)." [34]

Here Kosslyn considers a second stage of willed decisions that are determined by our goals, values, and beliefs -

> "What one is" consists in part of information in memory, which plays a key role in the processes that construct the alternatives, rationales, and anticipated consequences. In addition, "what one is" governs how one actually makes the decisions. And making that decision and experiencing the actual consequences in turn modifies "what one is," which then affects both how one constructs alternatives, rationales and anticipated consequences and how one makes decisions in the future. Thus, with time one's decisions construct what one is.

34 Kosslyn, in Libet (2005) p. xii-xii.



> "We are not simply accumulators of environmental events, filtered by our genetic make-ups. We bring something novel and unique to each situation — ourselves. Nietzsche (1886, as quoted in Strawson, 1994, p. 15) commented, "The causa sui is the best self-contradiction that has been conceived so far." Maybe not." [35]

## John Searle (2007)

John Searle has written extensively on the problem of consciousness and almost always reflects on the problem of free will. His position rarely changed over the decades, but in his recent short book *Freedom and Neurobiology* he has tackled the problem more directly and for the first time embraced **indeterminism** as a positive factor. Indeed, he goes as far as to say that quantum indeterminism is a requirement for consciousness.

In a breakthrough of sorts, Searle admits that he could never see, until now, the point of introducing quantum mechanics into discussions of consciousness and free will. Now he says we know two things, which correspond to the two requirements for free will:

> First we know that our experiences of free action contain both indeterminism and rationality...Second we know that quantum indeterminacy is the only form of indeterminism that is indisputably established as a fact of nature...it follows that quantum mechanics must enter into the explanation of consciousness." [36]

Searle describes "open" alternative courses of action. It is very important to place the "gap" or *causa sui* before or during the generation of these alternative possibilities for deliberation to be followed by willed action. The result is a two-stage, temporal-sequence model.

Then in a 2007 lecture at Google (available on YouTube), Searle describes his "Hypothesis 2" for free will.

He says three things are necessary:

35 *ibid.*, p. xiii-xiv.
36 Searle (2007) p. 74-75



1. some quantum indeterminism must be involved, but at "a lower level,"

2. a quantum explanation of consciousness is needed,

3. the higher-level of consciousness must inherit the indeterminism, but without inheriting the randomness.

Compare Karl Popper above,

> "A choice process may be a selection process, and the selection may be from some repertoire of random events, *without being random in its turn*." [Popper's italics]



## Martin Heisenberg (2009)

The most recent thinker to describe a two-stage model is Martin Heisenberg (son of physicist Werner), chair of the University of Würzburg's BioZentrum genetics and neurobiology section.

Since the indeterminacy principle was his father's work, Heisenberg's position that the physical universe is no longer determined and that nature is inherently unpredictable comes as no surprise. What is unusual is that Heisenberg finds evidence of free behavior in animals, including some very simple ones such as Drosophila, on which he is a world expert. Heisenberg argues for some randomness even in unicellular bacteria, followed by more lawful behaviors such as moving toward food.

> "Evidence of randomly generated action — action that is distinct from reaction because it does not depend upon external stimuli — can be found in unicellular organisms. Take the way the bacterium Escherichia coli moves. It has a flagellum that can rotate around its longitudinal axis in either direction: one way drives the bacterium forward, the other causes it to tumble at random so that it ends up facing in a new direction ready for the next phase of forward motion. This 'random walk' can be modulated by sensory receptors, enabling the bacterium to find food and the right temperature." [37]

37 Heisenberg (2009) p. 164

In higher organisms, the brain still may include elements that do a random walk creating options for action. The capability to generate new and unpredictable behaviors would have great survival value, and would likely be incorporated in higher organisms.

> "the activation of behavioural modules is based on the interplay between chance and lawfulness in the brain. Insufficiently equipped, insufficiently informed and short of time, animals have to find a module that is adaptive. Their brains, in a kind of random walk, continuously preactivate, discard and reconfigure their options, and evaluate their possible short-term and long-term consequences.
>
> "The physiology of how this happens has been little investigated. But there is plenty of evidence that an animal's behaviour cannot be reduced to responses. For example, my lab has demonstrated that fruit flies, in situations they have never encountered, can modify their expectations about the consequences of their actions. They can solve problems that no individual fly in the evolutionary history of the species has solved before. Our experiments show that they actively initiate behaviour." [38]

Heisenberg's combination of some randomness followed by some "lawful" behavior looks very much like William James' two-stage model, but now we have evidence for it in many animals. James would have been pleased.

In the next chapter, I will explain how my **Cogito** two-stage model solves some of the problems that have been raised about earlier two-stage models of free will.

I also show how the model can be extended to include **undetermined liberties** and the Self-Forming Actions of the libertarian Robert Kane.

38 Heisenberg (2009) p. 165.