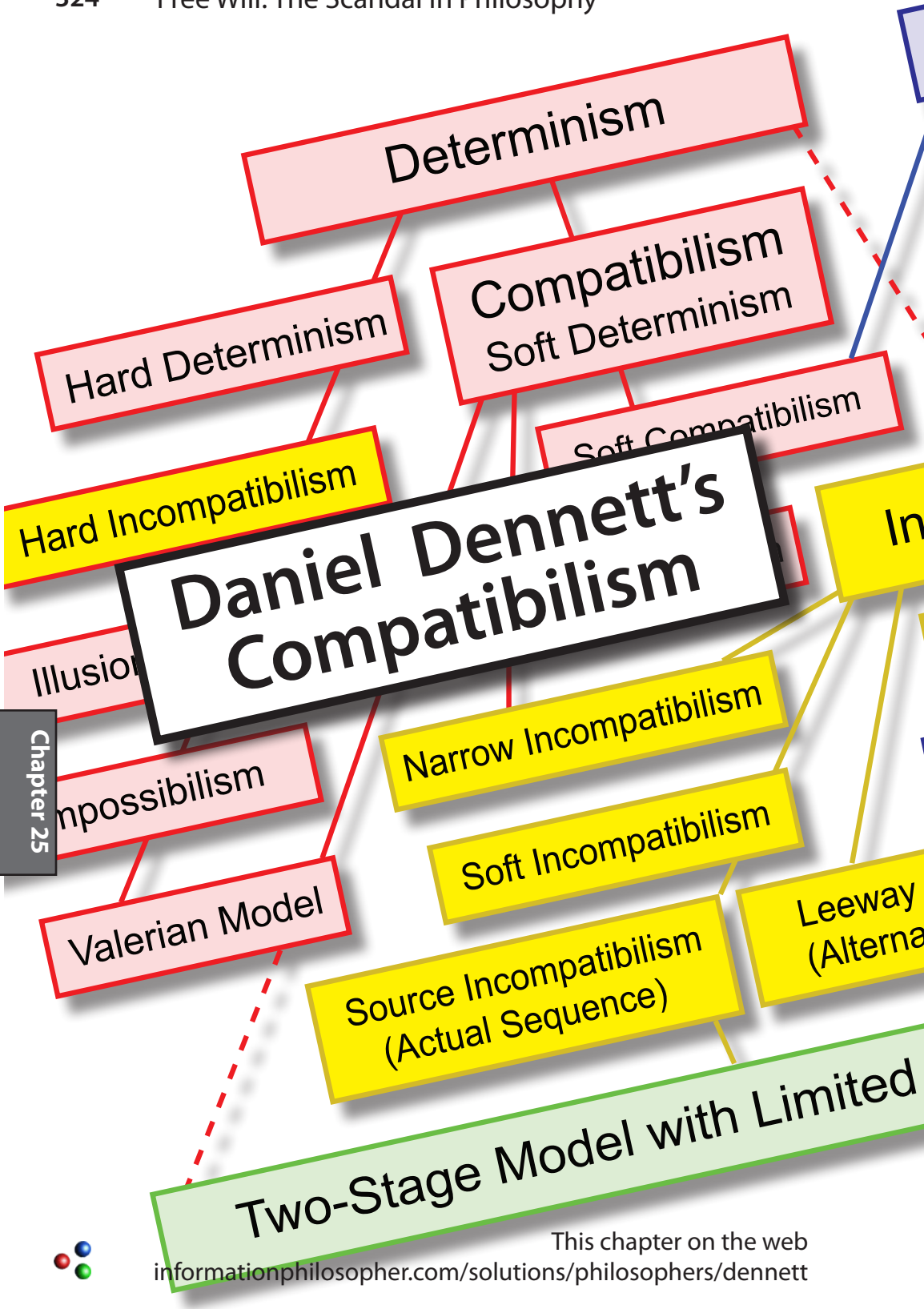
Determinism
Hard Determinism
Compatibilism
Soft Determinism
Hard Incompatibilism
Daniel Dennett's Compatibilism
Narrow Incompatibilism
Soft Incompatibilism
Valerian Model
Source Incompatibilism
(Actual Sequence)
Two-Stage Model with Limited

Daniel Dennett's Compatibilism

While he himself is a confirmed compatibilist, even a determinist, in "On Giving Libertarians What They Say They Want," Chapter 15 of his 1978 book Brainstorms, Daniel Dennett articulated the case for a two-stage model of free will better than any libertarian had done at the time.

His "Valerian" model of decision making, named after the poet Paul Valéry, combines **indeterminism** to generate **alternative possibilities**, with (in my view, adequate) determinism to choose among the possibilities.

> "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."[1]

Dennett gives six excellent reasons why this is the kind of free will that libertarians say they want. He says,

> 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

1 Dennett (1978) p. 295. Dennett studied in Oxford under Gilbert Ryle, whose "Concept of Mind" (1949) revolutionized the approach to philosophical psychology within analytic philosophy, eliminating mind as a "ghost in the machine.".

is just more efficient and in the end more rational that decision making should occur in this way."

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." [2]

I might add a seventh reason to Dennett's otherwise comprehensive list, that this kind of free will is a process that could have evolved naturally from the lower animals.

"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." [3]

At times, Dennett seems pleased with his result.

"This result is not just what the libertarian is looking for, but it is a useful result nevertheless. It shows that we can indeed install indeterminism in the internal causal chains affecting human behavior at the macroscopic level while preserving the intelligibility of practical deliberation that the libertarian requires. We may have good reasons from other quarters for embracing determinism, but we need not fear that macroscopic indeter-

2 Dennett (1978) pp. 295-207.
3 *ibid.*

> minism in human behavior would of necessity rob our lives of intelligibility by producing chaos." [4]

> "we need not fear that causal indeterminism would make our lives unintelligible." [5]

He realizes that his model is still at its base deterministic.

> "Even if one embraces the sort of view I have outlined, the deterministic view of the unbranching and inexorable history of the universe can inspire terror or despair, and perhaps the libertarian is right that there is no way to allay these feelings short of a brute denial of determinism. Perhaps such a denial, and only such a denial, would permit us to make sense of the notion that our actual lives are created by us over time out of possibilities that exist in virtue of our earlier decisions; that we trace a path through a branching maze that both defines who we are, and why, to some extent (if we are fortunate enough to maintain against all vicissitudes the integrity of our deliberational machinery) we are responsible for being who we are." [6]

At other times, Dennett is skeptical. His model, he says,

> "installs indeterminism in the right place for the libertarian, if there is a right place at all." and "it seems that all we have done is install indeterminism in a harmless place by installing it in an irrelevant place." [7]

Dennett seems to be soliciting interest in the model - from libertarian quarters? It is too bad that libertarians did not accept and improve Dennett's two-stage model. See What if Libertarians Had Accepted What Dan Dennett Gave Them in 1978? in Chapter 27.

If they had, the history of the free will problem would have been markedly different for the last thirty years, perhaps reconciling indeterminism with free will, as the best two-stage models now do, just as Hume reconciled freedom with determinism.

> "There may not be compelling grounds from this quarter for favoring an indeterministic vision of the springs of our action, but if considerations from other quarters favor indeterminism, we can at least be fairly sanguine about the prospects of incor-

4 Dennett (1978) p. 292.
5 *ibid.* p. 298.
6 *ibid.* p. 299.
7 *ibid.* p. 295.

> porating indeterminism into our picture of deliberation, even if we cannot yet see what point such an incorporation would have." [8]

The point of incorporating indeterminism is of course first to break the causal chain of pre-determinism, and second to provide a source for novel ideas that were not already implicit in past events, thus explaining not only free will but **creativity**. This requires irreducible and ontological quantum **indeterminacy**.

But Dennett does not think that irreducible quantum randomness provides anything essential beyond the deterministic pseudo-random number generation of computer science.

> "Isn't it the case that the new improved proposed model for human deliberation can do as well with a random-but-deterministic generation process as with a causally undetermined process? Suppose that to the extent that the considerations that occur to me are unpredictable, they are unpredictable simply because they are fortuitously determined by some arbitrary and irrelevant factors, such as the location of the planets or what I had for breakfast." [9]

With his strong background in computer science and artificial intelligence, it is no surprise that Dennett continues to seek a "computational" model of the mind.

But man is not a machine and the mind is not a computer.

Dennett accepts the results of modern physics and does not deny the existence of quantum randomness. He calls himself a "naturalist" who wants to reconcile free will with natural science.

But what is "natural" about a computer-generated pseudo-random number sequence? The algorithm that generates it is quintessentially artificial. In the course of evolution, quantum mechanical randomness (along with the quantum stability of information structures, without which no structures at all would exist) is naturally available to generate **alternative possibilities**.

Why would evolution need to create an algorithmic computational capability to generate those possibilities, when genuine and irreducible quantum randomness already provides them?

8 *ibid*. p. 299.
9 ibid. p. 298.

And who, before human computer designers, would be the author or artificer of the algorithm? Gregory Chaitin tells us that the information in a random-number sequence is only as much as is in the algorithm that created the sequence. And note that the artificial algorithm author implicitly has the kind of knowledge attributed to **Laplace's Demon**.

Since Dennett is a confirmed atheist, it seems odd that he has the "antipathy to chance" described by William James that is characteristic of religious believers. Quantum randomness is far more atheistic than Dennett's pseudo-randomness, with the latter's implicit author or artificer still conceivable.

Despite his qualms, Dennett seems to have located randomness in exactly the right place, in the first stage of a two-stage model. His model randomly generates alternative considerations for his adequately determined selection process. He is not concerned that random possibilities make the decisions themselves random.

Evolution as an Algorithmic Process

Dennett maintains that biological evolution does not need quantum randomness, and says he was shocked by Jacques Monod's claim that random quantum processes are "essential" to evolution. Monod defines the importance of chance, or what he calls "absolute coincidence" as something like the intersection of causal chains that Aristotle calls an "accident." But, says Dennett, in his 1984 book *Elbow Room*,

> "when Monod comes to define the conditions under which such coincidences can occur, he apparently falls into the actualist trap. Accidents must happen if evolution is to take place, Monod says, and accidents can happen — "Unless of course we go back to Laplace's world, from which chance is excluded by definition and where Dr. Brown has been fated to die under Jones' hammer ever since the beginning of time." (*Chance and Necessity*, p. 115)
>
> "If "Laplace's world" means just a deterministic world, then Monod is wrong. Natural selection does not need "absolute"

> coincidence. It does not need "essential" randomness or perfect independence; it needs practical independence — of the sort exhibited by Brown and Jones, and Jules and Jim, each on his own trajectory but "just happening" to intersect, like the cards being deterministically shuffled in a deck and just happening to fall into sequence. Would evolution occur in a deterministic world, a Laplacean world where mutation was caused by a non-random process? Yes, for what evolution requires is an unpatterned generator of raw material, not an uncaused generator of raw material. Quantum-level effects may indeed play a role in the generation of mutations, but such a role is not required by theory." [10]

Where Quantum Indeterminism Might Matter?

Dennett graciously invited me to participate in his graduate seminar on free will at Tufts in the Fall of 2010.[11] He challenged me to provide cases where quantum indeterminism would make a substantive improvement over the pseudo-randomness that he thinks is enough for both biological evolution and free will. Dennett does not deny **quantum indeterminacy**. He just doubts that quantum randomness is necessary for free will. Information philosophy suggests that the primary importance of quantum indeterminacy is that it breaks the causal chain of **pre-determinism**.

See the I-Phi page *Where, and When, is Randomness Located?* for more details on where indeterminism is located in the two-stage models of Bob Doyle, Robert Kane, Alfred Mele, and Dennett's Valerian Model of free will. [12]

Quantum randomness has been available to evolving species for billions of years before pseudo-randomness emerges with humans. But Dennett does not think, as does Jacques Monod, for example, that quantum indeterminacy is necessary for biological evolution. The evolved virtual creatures of artificial life programs demonstrate for Dennett that biological evolution is an algorithmic process.

10 Dennett (1985) p. 150.
11 See informationphilosopher.com/solutions/philosophers/dennett/seminar
12 informationphilosopher.com/freedom/location.html

Below are five cases where quantum chance is critically important and better than pseudo-randomness. They all share a basic insight from information physics. Whenever a stable new information structure is created, two things must happen. The first is a collapse of the quantum wave function that allows one or more particles to combine in the new structure. The second is the transfer away from the structure to the cosmic background of the entropy required by the second law of thermodynamics to balance the local increase in negative entropy (information).

Laplace's Demon

Indeterministic events are unpredictable. Consequently, if any such probabilistic events occur, as Dennett admits, Laplace's demon cannot predict the future. Information cosmology provides a second reason why such a demon is impossible. There was little or no information at the start of the universe. (See the Layzer diagram on page 11.) There is a great deal of information today, and more being created every day. There is not enough information in the past to determine the present, let alone completely determine the future. Creating future information requires quantum events, which are inherently indeterministic. The future is only probable, though it may be "adequately determined." Since there is not enough information available at any moment to comprehend all the information that will exist in the future, Laplace demons are impossible.

Intelligent Designers

Suppose that determinism is true, and that the chance driving spontaneous variation of the gene pool is merely epistemic (human ignorance), so that a deterministic algorithmic process is driving evolution. Gregory Chaitin has shown that the amount of information (and thus the true randomness) in a sequence of random numbers is no more than that in the algorithm that generates them.

This makes the process more comprehensible for a supernatural intelligent designer. And it makes the idea of an intelligent

designer, deterministically controlling evolution with complete foreknowledge, more plausible. This is unfortunate.

An intelligent designer with a big enough computer could reverse engineer and alter the algorithm behind the pseudo-randomness driving evolution. This is just what genetic engineers do.

But cosmic rays, which are inherently indeterministic quantum events, damage the DNA to produce mutations, variations in the gene pool. No intelligent designer can control such evolution.

So genetic engineers are intelligent designers, but they cannot control the whole of evolution.

Frankfurt Controllers

For almost fifty years, compatibilists have used Frankfurt-style Cases to show that alternative possibilities are not required for freedom of action and moral responsibility.

Robert Kane showed in 1985[13] that, if a choice is undetermined, the Frankfurt controller cannot tell until the choice is made whether the agent will do A or do otherwise. Compatibilists were begging the question by assuming a deterministic connection between a "prior sign" of a decision and the decision itself.

More fundamentally, information philosophy tells us that because chance (quantum randomness) helps generate the alternative possibilities, information about the choice does not come into the universe until the choice has been made.

Either way, the controller would have to intervene before the choice, in which case it is the controller that is responsible for the decision. Frankfurt controllers do not exist.

Dennett's Eavesdropper

We can call this Dennett's Eavesdropper because, in a discussion of quantum cryptography, Dennett agrees there is a strong reason to prefer quantum randomness to pseudo-randomness for encrypting secure messages. He sees that if a pseudo-random number sequence were used, a clever eavesdropper might discover the algorithm behind it and thus be able to decode the message.

13 David Widerker independently showed this in the 1990's.

Quantum cryptography and quantum computing use the non-local properties of entangled quantum particles. Non-locality shows up when the wave-function of a two-particle system collapses and new information comes into the universe. See the Einstein-Podolsky-Rosen experiment.[14]

Creating New Memes

Richard Dawkins' unit of cultural information has the same limits as purely physical information. Claude Shannon's mathematical theory of the communication of information says that information is not new without probabilistic surprises. Quantum physics is the ultimate source of that probability and the possibilities that surprise us. If the result were not truly unpredictable, it would be implicitly present in the information we already have. A new meme, like Dennett's intuition pumps, skyhooks, and cranes, would have been already predictable there in the past and not his very original creations.

The Valerian Model

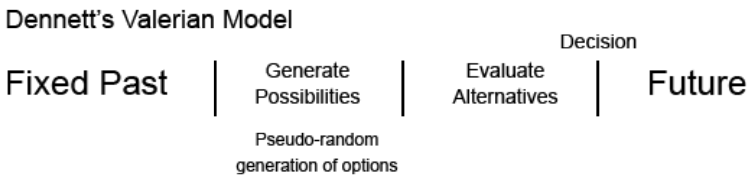

Figure 25-1. Dennett's Valerian Model.

Dennett's Valerian Model of decision making adds randomness in the first-stage generation of considerations, but he believes that pseudo-randomness (the kind generated by computer algorithms) is random enough.

Dennett sees no need for genuine irreducible quantum randomness in the mind, although he does not deny that the world contains genuine quantum indeterminacy. He also does not think, as does Jacques Monod, for example, that quantum indeterminacy is necessary for biological evolution. The evolved virtual creatures

14 informationphilosopher.com/solutions/experiments/EPR/

of artificial life programs demonstrate for Dennett that biological evolution is an algorithmic process.

Dennett says of the second stage that "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."

He says that "this model...provides some account of our important intuition that we are the authors of our moral decisions."

Who's Afraid of Indeterminism?

Dennett and his colleague Christopher Taylor wrote an article for the *Oxford Handbook of Free Will* entitled "Who's Afraid of Determinism." They say that "introducing indeterminism adds nothing in the way of worthwhile possibilities, opportunities, or competences to universe... Though pseudo-random generators may not produce genuinely random output, they come so close that no ordinary mortals can tell the difference."

Taylor and Dennett liken a deterministic universe to a computer playing games of chess.

> "Computers are marvels of determinism. Even their so-called random number generators only execute pseudo-random functions, which produce exactly the same sequence of "random" digits each time the computer reboots. That means that computer programs that avail themselves of randomness at various "choice" points will nevertheless spin out exactly the same sequence of states if run over and over again from a cold start… If you turned off the computer and then restarted it, running the same program, exactly the same variegated series of games would spin out." [15]

The purpose of the Taylor and Dennett article is "to untangle the complexity of the underlying concepts" in two "deeply confused theses concerning possibility and causation: (1) In a deterministic

15 Kane (2002) p. 257.

universe, one can never truthfully utter the sentence 'I could have done otherwise,' and (2) In such universes, one can never really take credit for having caused an event, since in fact all events have been predetermined by conditions during the universe's birth."

We agree that these two theses are confusing, but the confusion seems not that deep.

To clarify the first, (1) In a deterministic universe, the meaning of the true statement "I could have done otherwise" is "I could have done otherwise, if the past had been slightly different and I had chosen to do otherwise."

To clarify the second, (2) In such universes, one can take credit for having caused an event, since in fact the event and one's taking credit for it both would have been predetermined by conditions during the universe's birth."

Even if indeterminism were true, Taylor and Dennett say, the theses would be unaltered. But is this the case? At a minimum, some important points in their article would be altered.

Most important, the "fact"of predeterminism in thesis 2 would not be a fact. Indeed, they note the discovery of indeterminacy in modern quantum mechanics (p.259) and go on to observe (in footnote 22) that randomness could result from the presence or absence of a pulse from a Geiger counter. This would produce what they refer to as "genuine" randomness. (p.270)

It would then follow that a chess computer equipped with access to "genuine" quantum randomness would not "spin out exactly the same sequence of states if run over and over again from a cold start." But more significantly, there is no way for an indeterministic universe at its birth to know the future. There is simply not enough information present at the origin, or any other time, to describe perfectly and completely the present and future.