

Problems

Being and Becoming

Abstract Entities

Coinciding Objects

Compo

Chapter 11

Chance

God and Im

**Free Will**

Constitutio

Identity

Individuation

Mind-Body

Modality

Necessity or Contingency

Possibility and Actuality

Space an

Universals

Vagueness

Wave

Can Information Philo



## Free Will

The existence of free will depends on the existence of genuine possibility (some absence of necessity), in the sense of counterfactual situations in the past that were alternative possibilities for action. They allow us to say that we could have done otherwise.

Information philosophy has shown that ontological possibilities exist because new information has been entering the universe since its origin. Information theory shows that new information is not possible without multiple possibilities. If information were a conserved quantity, like matter and energy, the universe would be Laplacian and deterministic. The evidence from cosmological, biological, and human information growth grounds the fundamental basis for information philosophy.

Philosophical talk about possibilities today is largely found in discussions about “possible worlds.” Unfortunately, the possible worlds in DAVID LEWIS’s “modal realism” are all eliminative materialist and deterministic. Lewis views our “actual world” as completely deterministic. All other possible worlds, visualized by him as separate spatio-temporal domains, are equally “actual” for their inhabitants. His counterfactuals are all necessary.

Nevertheless, we can explain genuine free will in metaphysical terms using the possible world semantics of SAUL KRIPKE, who maintained that his semantics could be used to describe various ways our actual world might have been. Unlike many other “possible world” interpretations, Kripke accepts that empirical facts in the physical world are *contingent*, that many things might have been otherwise. Kripke’s counterfactuals are genuinely different ways the world might have been.

“I will say something briefly about ‘possible worlds.’ (I hope to elaborate elsewhere.) In the present monograph I argued against those misuses of the concept that regard possible worlds as something like distant planets, like our own sur-

There are no genuine possibilities in Lewis’s “possible worlds”!



roundings but somehow existing in a different dimension, or that lead to spurious problems of ‘transworld identification.’ Further, if one wishes to avoid the Weltangst and philosophical confusions that many philosophers have associated with the ‘worlds’ terminology, I recommended that ‘possible state (or history) of the world’, or ‘counterfactual situation’ might be better. One should even remind oneself that the ‘worlds’ terminology can often be replaced by modal talk—‘It is possible that ...?’

‘Possible worlds’ are total ‘ways the world might have been,’ or states or histories of the entire world.”<sup>1</sup>

Following Kripke, we build a model structure  $\mathcal{M}$  as an ordered triple  $\langle \mathbf{G}, \mathbf{K}, \mathbf{R} \rangle$ .  $\mathbf{K}$  is the set of all “possible worlds,”  $\mathbf{G}$  is the “actual world,”  $\mathbf{R}$  is a reflexive relation on  $\mathbf{K}$ , and  $\mathbf{G} \in \mathbf{K}$ .

If  $\mathbf{H}_1$ ,  $\mathbf{H}_2$ , and  $\mathbf{H}_3$  are three possible worlds in  $\mathbf{K}$ ,  $\mathbf{H}_1 \mathbf{R} \mathbf{H}_2$  says that  $\mathbf{H}_2$  is “possible relative to” or “accessible from”  $\mathbf{H}_1$ , that every proposition true in  $\mathbf{H}_2$  is possible in  $\mathbf{H}_1$ .

Indeed, the  $\mathbf{H}$  worlds and the actual world  $\mathbf{G}$  are all mutually accessible and each of these is possible relative to itself, since  $\mathbf{R}$  is reflexive.

Now the model system  $\mathcal{M}$  assigns to each atomic formula (propositional variable)  $P$  a truth-value of T or F in each world  $\mathbf{H} \in \mathbf{K}$ .

Let us define the worlds  $\mathbf{H}_1$ ,  $\mathbf{H}_2$ , and  $\mathbf{H}_3$  as identical to the real world  $\mathbf{G}$  in all respects except the following statements describing actions of a graduating college student Alice deciding on her next step.

In  $\mathbf{H}_1$ , the proposition “Alice accepts admission to Harvard Medical School” is true, but false in other worlds, so “possible.”

In  $\mathbf{H}_2$ , the proposition “Alice accepts admission to MIT” is true.

In  $\mathbf{H}_3$ , the proposition “Alice postpones her decision and takes a ‘gap year’” is true.

At about the same time, in the actual world  $\mathbf{K}$ , the statement “Alice considers graduate school” is true.

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1 Kripke (1981) *Naming and Necessity*, p. 15, 18



Note that the abstract information that corresponds to the three possible worlds **H** is embodied physically in the matter (the neurons of Alice's brain) in the actual world and in the three possible worlds. There is no issue with the "transworld identity" of Alice as there would be with Lewis's "modal realism," because all these possible worlds are in the same spatio-temporal domain.

The metaphysical question is which of the three possible worlds becomes the new actual world, say at time  $t$ . What is the fundamental structure of reality that supports the simultaneous existence of alternative possibilities?

Just before time  $t$ , we can interpret the semantics of the model structure  $\mathcal{M}$  as saying that the above statements were "merely possible" thoughts about future action in Alice's mind.

Note also that just after the decision at time  $t$ , the three possible alternatives remain in Alice's experience recorder and reproducer as memories.

Some consequences of Alice's alternative possible decisions.

In the future of world **H<sub>1</sub>**, Alice's research discovers the genetic signals used in messaging by cancer cells and cancer is eliminated. Several hundred million lives are saved (extended) in Alice's lifetime.

In the future of world **H<sub>2</sub>**, Alice engineers the miniaturization of nuclear weapons so they are small enough to be delivered by tiny drones. One is stolen from an air force base by a terrorist and flown to an enemy country where millions of lives are lost. Alice kills herself the next day.

In the future of world **H<sub>3</sub>**, a mature Alice returns to school, completes her Ph.D. in Philosophy at Princeton and writes a book titled *Free Will and Moral Responsibility*.

### The Two-Stage Model of Free Will

In our possible worlds analysis of free will, two things are still not clear. First is understanding the causal processes that are involved when our agent chooses between worlds H<sub>1</sub>, H<sub>2</sub>, and H<sub>3</sub>, making one of them the new "actual world." Was the decision process



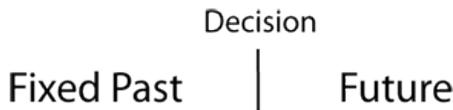
causally determined? Secondly, what are the processes of thought that led to the three options “coming to mind” of the agent. Were these also determined, or was there an element of indeterminism?

The laws of nature are the same in all of our possible worlds, since they are all contained within the same spatio-temporal volume as our actual world. They include the critically important theory of quantum physics, which includes the occurrence of indeterministic events that are only statistically caused.

The two-stage model of free will is very simple. In the creative first stage the agent calls to mind familiar alternative possibilities or generates brand new possibilities, perhaps by creating new ones that depend in part on random noise events in the agent’s brain (not mind). The ontological chance in the first stage ensures that actions are not determined or even pre-determined from the beginning of the universe by causal chains, as some compatibilist philosophers believe. These events bring new information into the universe.

In the deliberative second stage, the possibilities generated in the first stage are evaluated. Given enough time, each possibility is compared with the agent’s reasons, motives, feelings, desires, etc. (in short, with the agent’s character) and one is normally chosen. In the event that there is no obvious best decision, the agent can “think again,” perhaps generating a new and better alternative. Finally, with time running out or faced with no obvious best option, the agent may just select one of the alternatives in what is called a “torn decision” by ROBERT KANE

Given the “laws of nature” and the “fixed past” just before a decision, philosophers wonder how a free agent can have any possible alternatives. This is partly because they imagine a timeline for the decision that shrinks the decision process to a single moment.

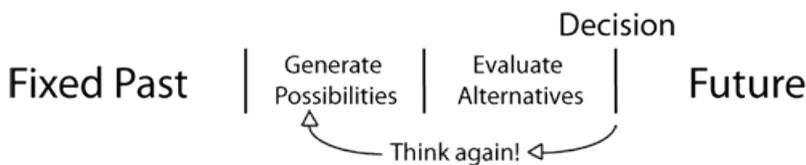


Collapsing the decision to a single moment between the closed fixed past and the open ambiguous future makes it difficult to see the free thoughts of the mind followed by the willed and adequately determined action of the agent in the second stage.

In our model, thoughts are freely generated. Actions are adequately determined by the agent. Thoughts are free. Actions are willed.

Notice that the two-stage model is not limited to a single step of generating alternative possibilities followed by a single step of self-determination by the will. It is better understood as a continuous process of possibilities generation, perhaps by the subconscious (parts of the brain that leave themselves open to noise) at the same time as adequately determined choices are being considered by the same brain parts, perhaps, but now averaging over any quantum events, filtering out the microscopic noisiness that might otherwise make the determination random.

In particular, note that a special kind of decision might occur when the agent finds that none of the current options are good enough for the agent's character and values to approve. The agent then might figuratively say, "Think again!"

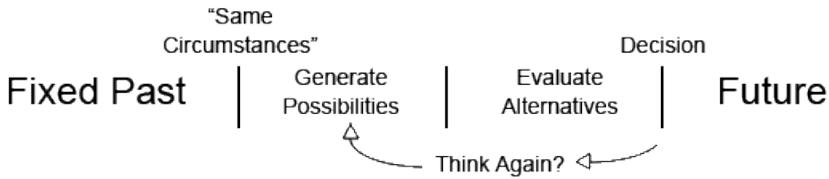


Many philosophers have puzzled how an agent could do otherwise in exactly the same circumstances. Since humans are intelligent organisms, and given our model system of "possible worlds," it is impossible that an agent is ever in exactly the same circumstances. The agent's memory (information stored in the ERR) of earlier similar experiences guarantees that.

This two-stage model makes a somewhat artificial separation between first-stage creative randomness and second-stage deliberative evaluation. These two capabilities of the mind can be going on at the same time. That can be visualized by the occasional decision to go back and think again, when the available alternatives are not



good enough to satisfy the demands of the agent's character and values, or by noticing that the subconscious might be still generating possibilities while the agent is in the middle of evaluations.

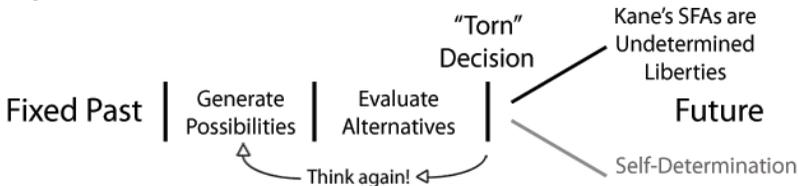


The two-stage model lies between the work of libertarians and compatibilists, in the sense that the free elements in the first stage are what the libertarian needs and the adequately determined evaluations and decisions are what the compatibilist needs for the moral responsibility of the agent. Robert Kane calls the outcomes of such torn decisions “self-forming actions,” because the accumulation of such actions builds the agent's character.

Now Kane has argued that on some occasions the agent may not be able to find grounds for choosing between a prudential, self-interested choice and a moral, other-interested decision. In case of such a “torn decision” the agent may simply allow indeterminism to enter into the decision but be prepared to take responsibility for either choice.

Compatibilists have argued that any randomness in the final decision would make the agent not responsible for the decision. But Kane has nicely solved this dilemma.

Let's diagram Kane's “self-forming action” (SFA) to place it in the temporal sequence of events between the “fixed past” at the start of a decision process, and the decision itself, which marks the beginning of the future.



In the end, Kane's model, resolving "torn decisions" by an indeterministic choice between alternatives that are all motivated by good reasons, is an important supplement to the two-stage model. He calls this "plural rational control." We call them "undetermined liberties." They nicely complement decisions that are arrived at in an adequately determined way, which we call self-determination.

Self-determination means that the agent and only the agent "causes" the decision. There is no randomness in the choice, so we now embrace the idea of agent causation, as opposed to the idea that free will can be understood by analyzing "events."

"Free Will" in scare quotes refers to the common but mistaken notion that the adjective "free" modifies the concept "will." In particular, it indicates that the element of chance, one of the two requirements for free will is present in the determination of the will itself.

Critics of "libertarian free will" usually adopt this meaning in order to attack the idea of randomness in our decision-making process, which clearly would not help to make us morally responsible.

Unfortunately, even defenders of libertarian free will (Robert Kane, for example) continue to add indeterminism into the decision itself, making such free will "unintelligible" by their own account.

Despite their claim that they are better equipped than scientists to make conceptual distinctions and evaluate the cogency of arguments, professional philosophers have mistakenly conflated the concepts of "free" and "will." They (con)fuse them with the muddled term "free will," despite clear warnings from John Locke that this would lead to confusion.

Locke said clearly, as had some ancients like LUCRETIVUS, it is not the will that is free (in the sense of undetermined), it is the mind.

Locke liked the idea of Freedom and Liberty. He thought it was inappropriate to describe the Will itself as Free. The Will is a Determination. It is the Man who is Free.

In his great *Essay Concerning Human Understanding*, Locke calls the question of Freedom of the Will unintelligible. But for Locke, it is only because the adjective "free" applies to the agent, not to the will, which is determined by the mind, and determines the action.



“I think the question is not proper, whether the will be free, but whether a man be free...

“This way of talking, nevertheless, has prevailed, and, as I guess, produced great confusion.”<sup>2</sup>

Freedom of human action requires the randomness of absolute chance to break the causal chain of determinism, yet the conscious knowledge that we are adequately determined to be responsible for our choices and our actions.

Freedom requires some events that are not causally determined by immediately preceding events, events that are unpredictable by any agency, events involving quantum uncertainty. These random events create alternative possibilities for action.

*Randomness is the “free” in free will.*

In short, there must be a randomness requirement, unpredictable chance events that break the causal chain of determinism. Without this chance, our actions are simply the consequences of events in the remote past. This randomness must be located in a place and time that enhances free will, one that does not reduce it to pure chance. Randomness, in the form of creative new ideas among the alternative possibilities, is what breaks the causal chain.

*(Determinists do not like this requirement.)*

Freedom also requires an adequately determined will that chooses or selects from those alternative possibilities. There is effectively nothing uncertain about this choice.

*Adequate determinism is the “will” in free will.*

So there is also a determinism requirement - that our actions be adequately determined by our character and values. This requires that any randomness not be the *direct cause* of our actions.

*(Libertarians do not like this requirement.)*

Adequate determinism means that randomness in our thoughts about alternative possibilities does not *directly cause* our actions.

A random thought can lead to a “determined” action, for which we can take full responsibility.

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2 Locke (1690) *Essay Concerning Human Understanding*, Book II, Chapter XXI, Of Power, s.21



*We must admit indeterminism  
but not permit it to produce random actions  
as Determinists mistakenly fear.  
We must also limit determinism  
but not eliminate it  
as Libertarians mistakenly think necessary.*

Philosophers of logic and language are further muddled in their argument that if determinism is false, indeterminism is true. This is of course logically correct. Strict causal determinism with a causal chain of necessary events back to an Aristotelian first cause is indeed false, and modern philosophers know it, though most hold out hope that the quantum mechanical basis of such indeterminism will be disproved someday. Many analytic language philosophers simply declare themselves agnostic on the truth or falsity of determinism, missing the empirical point.

These agnostic philosophers go on to argue that the principle of bivalence requires that since determinism and indeterminism are logical contradictories, only one of them can be true. The law of the excluded middle allows no third possibility. Now since neither determinism nor indeterminism allow the kind of free will that supports moral responsibility, they claim that free will is unintelligible or an illusion. This is the *standard argument against free will*.<sup>3</sup>

The practical empirical situation is much more complex than such simple black and white logical linguistic thinking can comprehend. Despite quantum uncertainty, there is clearly adequate determinism in the world, enough to permit the near-perfect predictions of celestial motions, and good enough to send men to the moon and back. But this determinism is neither absolute nor required in any way by logical necessity, as Aristotle himself first argued against the determinist atomists, Democritus and Leucippus.

When we unpack the complex concept of “free will,” we find the freedom is in our *thoughts*, the determination is in our willed *actions*. Self-determination is not determinism.

3 See Doyle, (2011) *Free Will, The Scandal in Philosophy*, chapter 4.



In our two-stage model, “free will” combines two distinct concepts. Free is found in the chance and randomness of the first stage. Will is the *adequately determined* choice in the second stage.

*Our Thoughts are Free, they come to us.*

*Our Actions are Willed, they come from us.*

*Compatibilists and Determinists were right about the Will, but wrong about Freedom.*

*Libertarians were right about Freedom, but wrong about the Will, which is determined enough to insure moral responsibility.*

### Does Ontological Chance Threaten Free Will?

The modest indeterminism required for free will is not the chaotic irrational threat feared by so many philosophers and scientists since Chrysippus over 2000 years ago, since most physical and mental events are overwhelmingly “adequately determined.”

There is no problem imagining that the three traditional mental faculties of reason - perception, conception, and comprehension - are all carried on with “adequate determinism” in a physical brain where quantum events and thermal noise do not interfere with normal operations.

There is also no problem imagining a role for chance in the brain in the form of quantum level noise (as well as pre-quantal thermal noise). Noise can introduce random errors into stored memories. Noise can create random associations of ideas during memory recall. Many scientists have speculated that this randomness may be driven by microscopic fluctuations that are amplified to the macroscopic level. This need not happen in some specific location in the brain. It is most likely a general property of all neurons or whichever parts of the brain are storing our memories.

We distinguish seven increasingly sophisticated ideas about the role of chance and indeterminism in the question of free will. Many libertarians have accepted the first two. Determinist and compatibilist critics of free will make the third their central attack on chance, mistakenly claiming that it denies moral responsibility.



But very few if any thinkers appear to have considered all the seven essential requirements for chance to contribute to libertarian free will.

1. Chance is important for free will because it breaks the causal chain of determinism.
2. Chance exists in the universe. Quantum mechanics is correct. Indeterminism is “true,” etc.
3. But chance should not directly cause our actions. We cannot be responsible for random actions.
4. Chance can generate random (unpredictable) alternative possibilities for action or thought. But the choice or selection of one action must be adequately determined by our reasons, motives, feelings, desires, in short, by our character and values, so that we can take full responsibility for our actions. And once we choose, the connection between mind/brain and muscle control must be adequately determined to see that “our will be done.”
5. Chance, in the form of noise, both quantum and thermal noise, is always present. The naive model of a single random microscopic event, amplified to affect the macroscopic brain, never made sense. Under what *ad hoc* circumstances, at what time, at what place in the brain, would it occur to affect a complex decision?
6. Although always present, chance must be overcome or suppressed by the adequately determined will when it decides to act, de-liberating the prior free options that mean “one could have done otherwise.”
7. To the extent that chance is not completely suppressed by the will, the resulting choice can be considered to have an element of randomness. The agent can still take responsibility for allowing the choice to be partially or completely random, the equivalent of flipping a mental coin. We can choose to act randomly, when none of our options is clearly the “best.”

