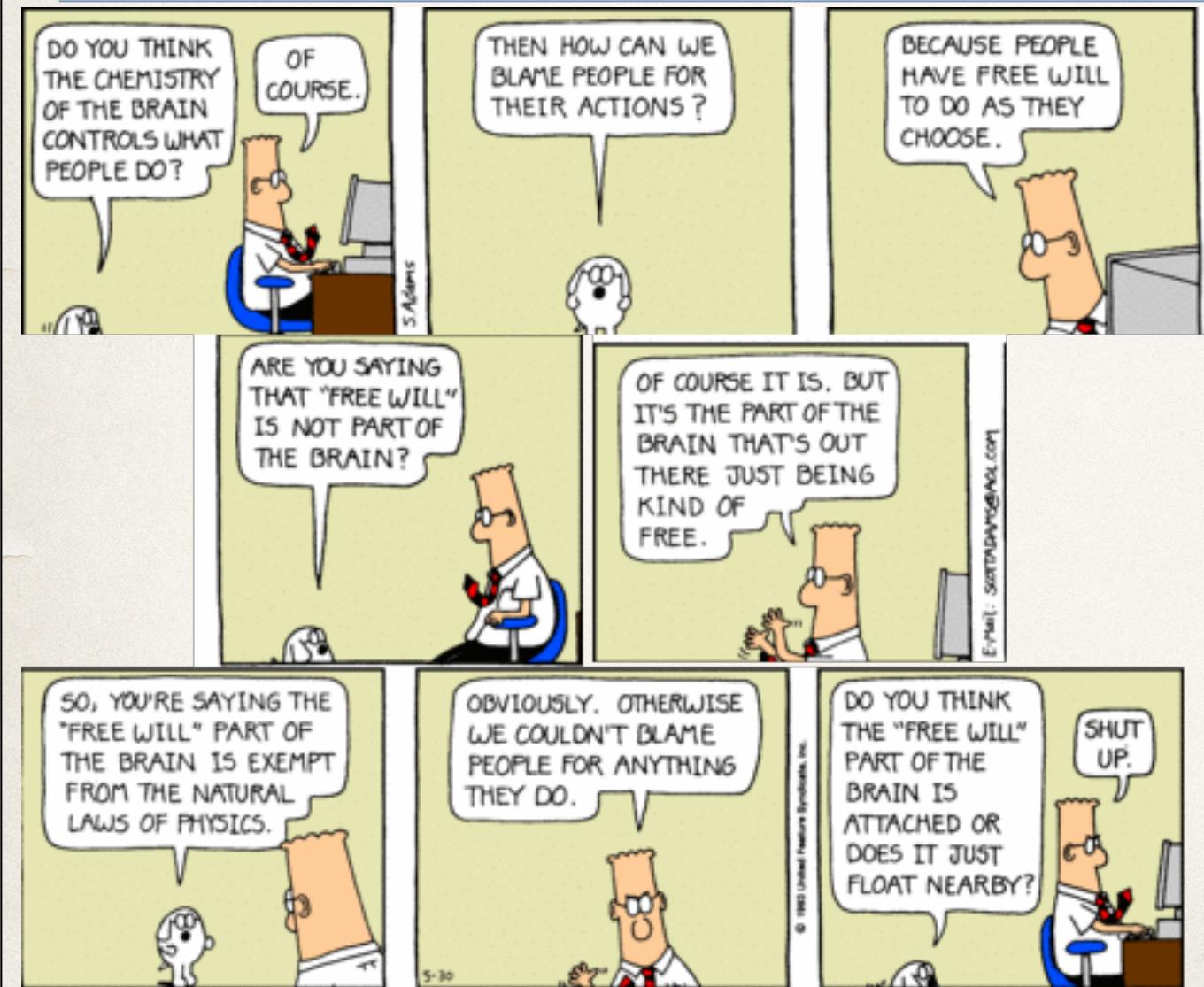


# Free Will and the Future

Is the future  
predetermined?



Do we have  
free will?

# Is the Future Predetermined?

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# Aristotle's Sea Battle Argument

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1. Either there will be a sea battle tomorrow or there will not be one.
  - A. If **there will be** a sea battle, then it is unalterable that there will be a sea battle tomorrow. [*see following slides*]
  - B. If **there will not be** a sea battle tomorrow, then it is unalterable that there will not be a sea battle tomorrow. [*similar to A*]
2. In both cases, an inevitable event—that is, the inevitable sea battle or the inevitable non-occurrence of a sea battle—will result.
3. No matter what will happen, then, the future is predetermined.

# If There Will Be a Sea Battle Tomorrow, It Is Unalterable that There Will Be One — How So?

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*Let's look at the past first and  
then at the future*

# If an Event Has Happened, Then the Event Cannot be Altered

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- ✿ If the statement “Event E has happened in the past” is true, then E cannot be altered, that is, there is nothing we can do to make E not happen.

*What was true in the past cannot be altered because it belongs to the past. We cannot change the past.*

# Can We Alter the Future? (A)

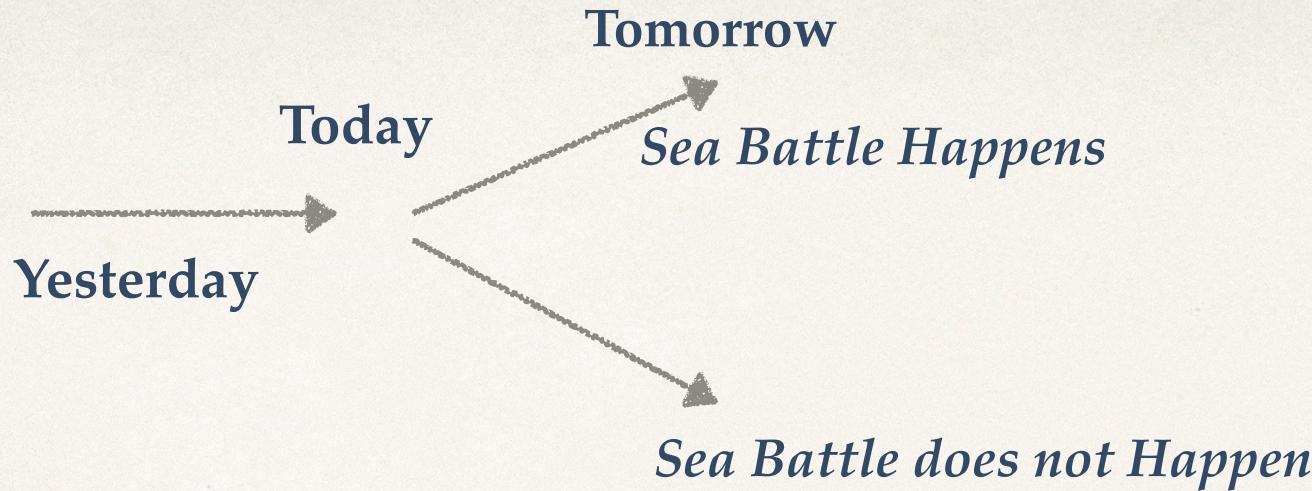
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1. Suppose it is true **there will be** a sea battle on Sept 30, 2014
2. So, it is true **today** that there will be a sea battle on Sept 30, 2014
3. So, it was true **yesterday** that there would be a sea battle Sept 30, 2014
4. But if what was true in the past cannot be altered [*see previous slide*], it follows from step 3 that it cannot be altered that it was true **yesterday** that there would be a sea battle on Sept 30, 2014.
5. If it cannot be altered that it was true **yesterday** that there would be a sea battle on Sept 30, 2014, then it cannot be altered that **there will be** a sea battle on Sept 30, 2014

# Can We Alter the Future? (B)

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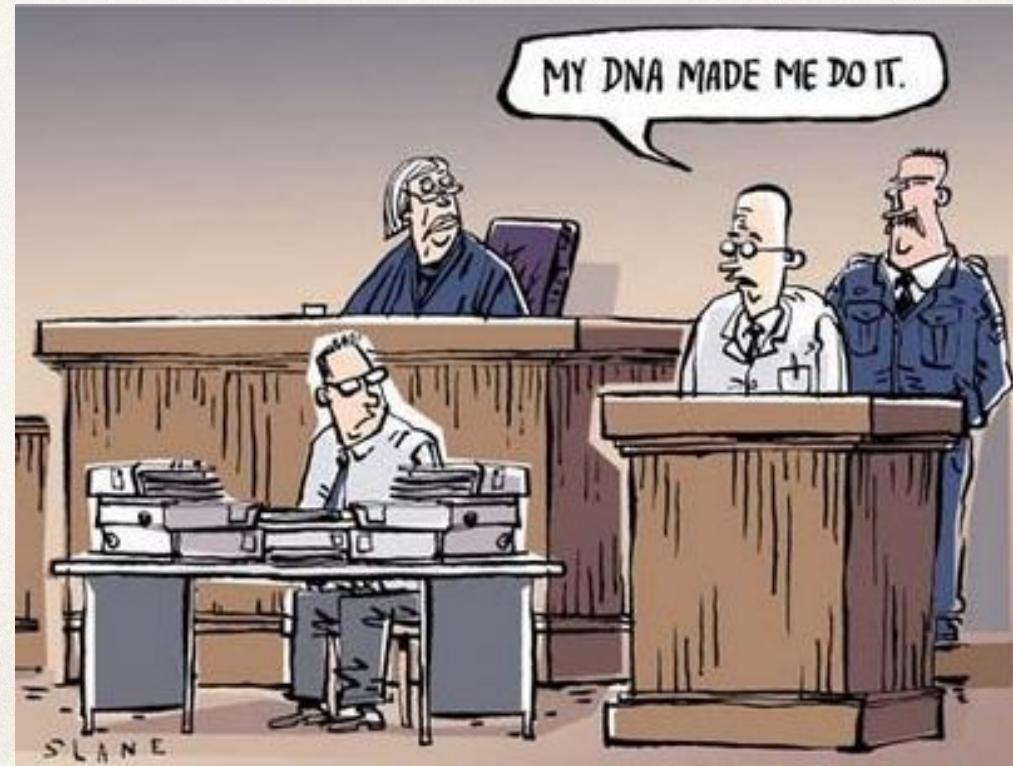
1. Suppose it is true **there will not be** a sea battle on Sept 30, 2014
2. So, it is true **today** that there will not be a sea battle on Sept 30, 2014
3. So, it was true **yesterday** there would not be a sea battle Sept 30 2014
4. But if what was true in the past cannot be altered [*see previous slide*], it follows from step 3 that it cannot be altered that it was true **yesterday** that there would not be a sea battle on Sept 30, 2014.
5. If it cannot be altered that it was true **yesterday** that there would be a sea battle on Sept 30, 2014, then it cannot be altered that **there will not be** a sea battle on Sept 30, 2014



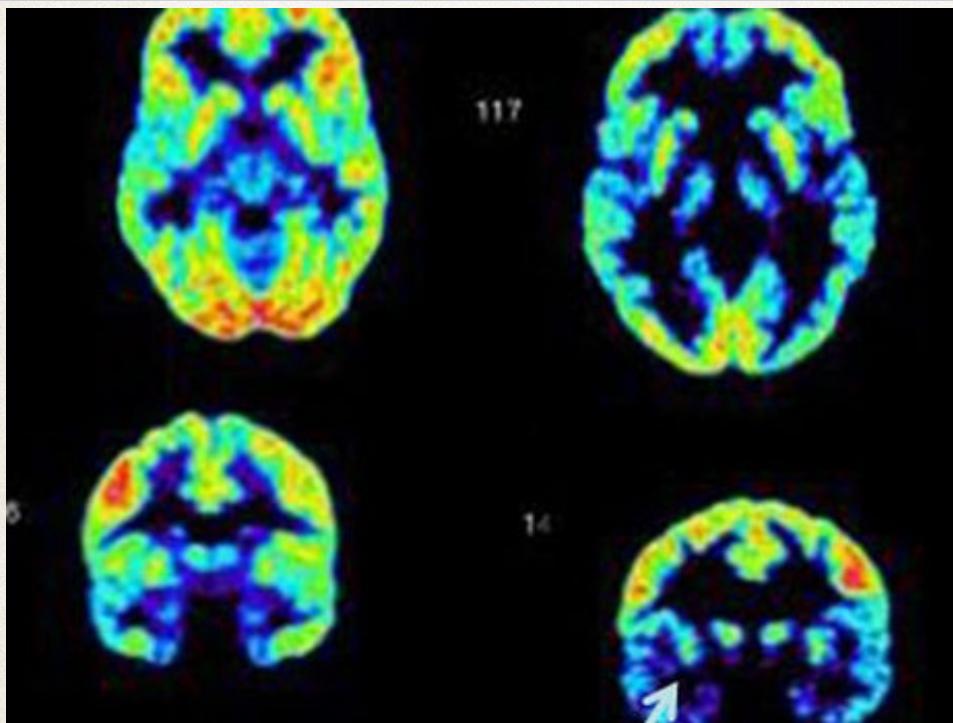
- ✿ If the sea battle happens tomorrow, it is inevitable that it will happen.
- ✿ If the sea battle does not happen tomorrow, it is inevitable that it will *not* happen.
- ✿ Either way, what will happen or not happen tomorrow is inevitable. *Hence, the future is predetermined.*

# Are the Future and Our Actions Really Predetermined in Advance?

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# Findings from Neuroscience



Jim Fallon from the University of California at Irvine studied the brains of people who committed violent crimes. He compared their brains with the brains of non-criminals. *He found a correlation between brain activity and crime.* The brain on the right belongs to a criminal and the brain on the left belongs to a non-criminal.

# Findings from Genetics

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Jim Fallon from the University of California at Irvine also found that those who committed violent crimes typically have what has been called the **"warrior gene"**—a particular gene that is associated with violent behavior.

Jim Fallon, however, also found that he himself has the warrior gene, although he has never committed a crime!

So, one's genetic makeup is not sufficient to trigger violent behavior. The warrior gene simply *predisposes* one to violence.

Still, the combination of the warrior gene *plus* a certain social environment might very well cause criminal behavior.

# Warrior Gene Predicts Violent Behavior in Response to Provocation

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*"There is some evidence of a main effect for genotype and some evidence for a gene by environment interaction, such that MAOA [=warrior gene] is less associated with the occurrence of aggression in a low provocation condition, but **significantly predicts such behavior in a high provocation situation.**"*

"Monoamine oxidase A gene (MAOA) predicts behavioral aggression following provocation" by McDermott, Tingley, Cowden, Frazzetto and Johnstone in Proceeding of the National Academy of Science of USA, 2009

In other words, people with the warrior gene are more likely to behave violently than people without the warrior gene, provided they are provoked.

# What Does it Mean that Everything is Predetermined?

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## Determinism

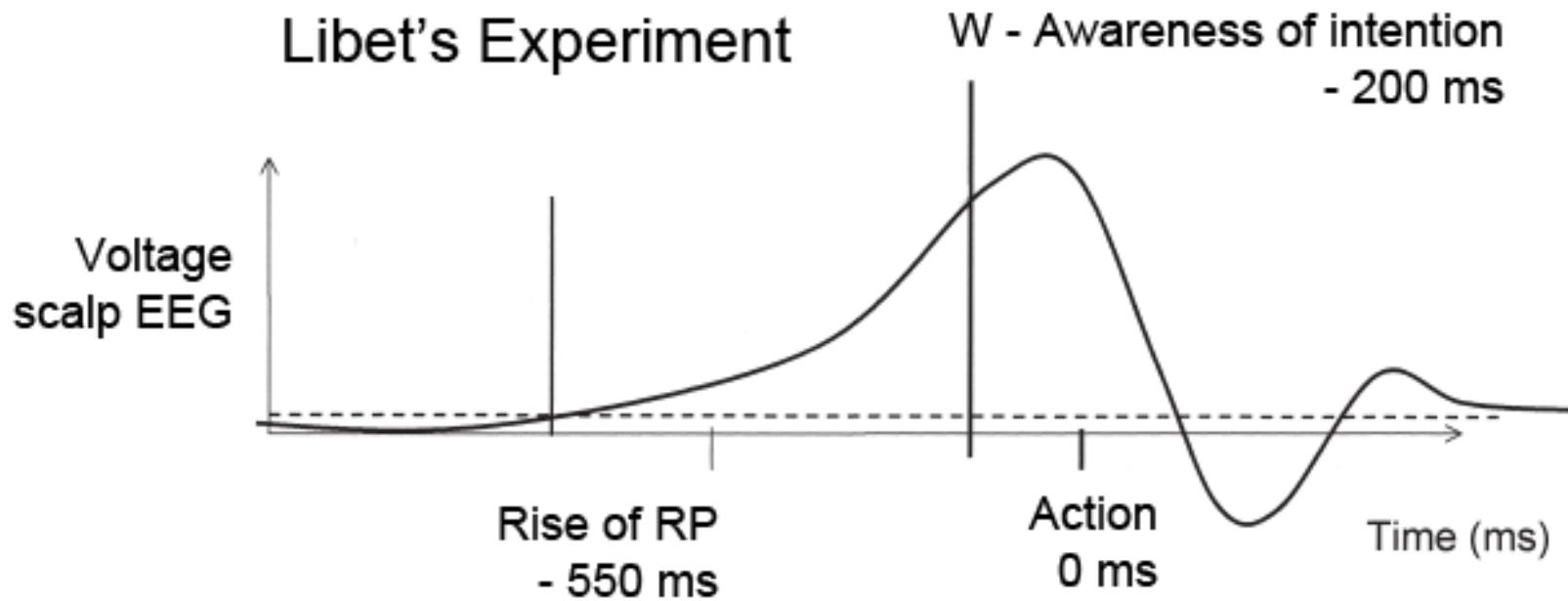
According to the laws of nature, every event is caused by another event which in turn is caused by yet another event and so on.

The causal chain that leads to the occurrence of an event is such that the event in question will *inevitably* happen.

Think of an object falling down. If I am holding an object at a certain height and I let it go, the object will inevitably fall down because of gravity. It is predetermined that in letting the object go, it would fall downward (and not upward).

Now, if you extend this picture to everything that happens, even to human actions, that's determinism.

# Libet's Experiment in the 1980's



Brain activity in the form of the *Readiness Potential* starts 550 ms before the action, although the conscious intention to act occurs only 200 ms before the action. *Brain activity precedes our conscious intention to act.*

# How the Experiment Was Conducted

Box 1 | Measuring conscious intention

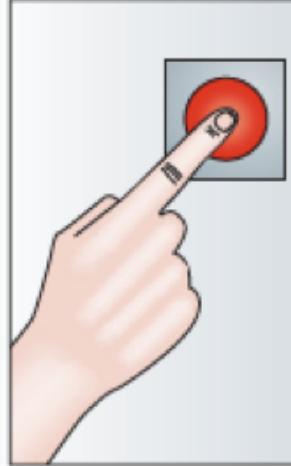
1 Observe clock



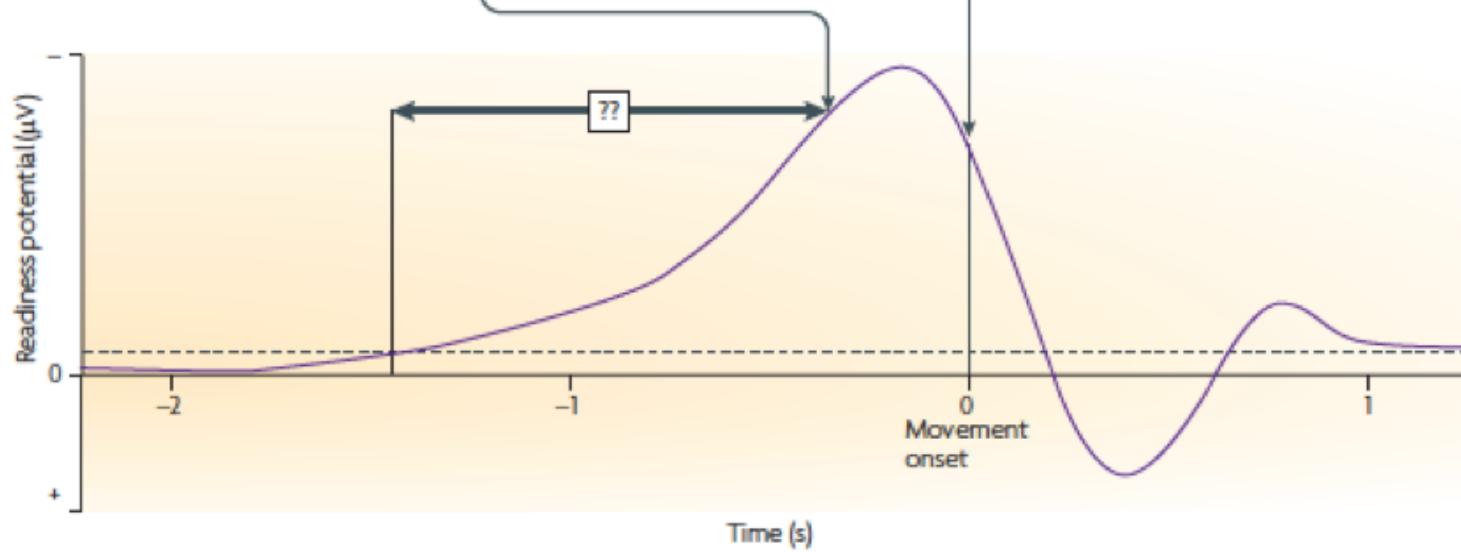
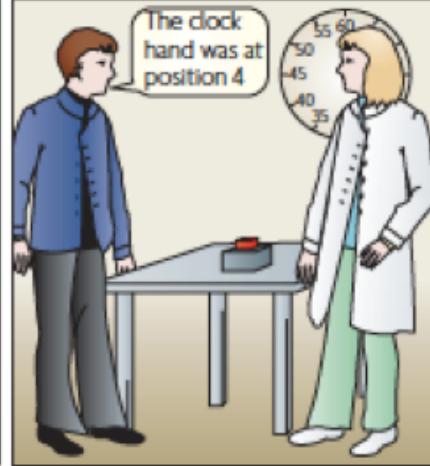
2 Note clock position at time of conscious intention (urge to act)



3 Perform action



4 Report clock position at time of conscious intention



Subjects were asked to report when they felt the intention to act by looking at a clock. The clock was not a normal clock but allowed greater precision.

# Another Experiment

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John-Dylan Haynes from the Bernstein Center for Computational Neuroscience in Berlin conducted an experiment that shook his view of life. In the experiment .. the subjects were free to press a button with either their left or right index fingers whenever they felt the urge.

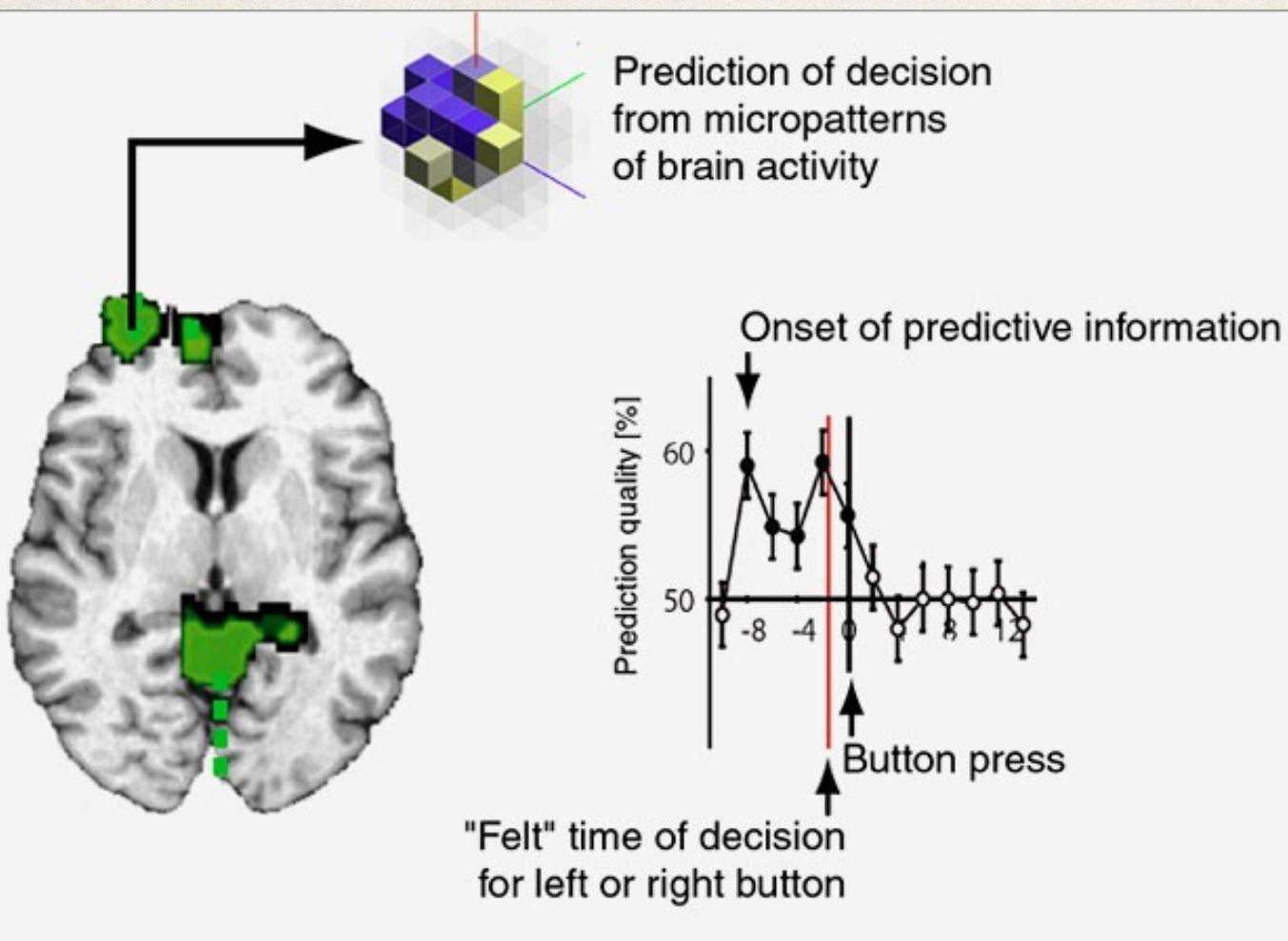
... the *conscious decision* to press a button occurred about **a second before** the act was performed.

....the observation of *patterns of brain activity* could reliably predict the decision up to **seven seconds in advance**.

Unconscious determinants of free decisions in the human brain.

Soon CS, Brass M, Heinze HJ, Haynes JD.

Published in Nat Neurosci. 2008 May;11(5):543-5.



Haynes found that

- (1) the conscious decision is preceded by brain activity, and
- (2) by decoding the patterns of brain activity (*see green patterns*), we can reliably predict our actions well before our conscious decisions.

Unconscious determinants of free decisions in the human brain.

Soon CS, Brass M, Heinze HJ, Haynes JD.  
Published in Nat Neurosci. 2008 May;11(5):543-5.

# The Significance of Libet's and Haynes' Experiment

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These experiments do not directly show that we lack free will, but they suggest that our decisions and actions are predetermined in advance.

1. Both experiments show that our conscious decisions are preceded by some electrochemical activity in the brain.
2. The patterns of electrochemical activity in the brain determines what our next action will be without us having any ability to change it; *see in particular Haynes' experiment.*
3. Since the patterns of electrochemical activity in the brain are subject to the laws of nature, these patterns are predetermined in advance (just as it is predetermined that in letting an object go, it would fall toward gravity).

# From John-Dylan Haynes' Website

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“Decisions don’t come from nowhere but they emerge from prior brain activity. Where else should they come from?

In theory it could be possible to trace the causal pathway of a decision all the way back to the big bang.

Our research shows that we can trace it back 10 seconds. Compared to the time since the big bang this is not very long.”

# Arguments for the Conclusion that Everything (Even our Decisions and Actions) is Predetermined

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Aristotle's sea battle argument

Findings from genetics showing that people with the warrior gene are more likely to commit violence

Findings from neuroscience showing that patterns of brain activity predict our actions before we make the conscious decision to act

If an all-powerful God exists, He knows our decisions before we make them, so that our decisions are set in advance

From the question  
*whether everything is predetermined*  
to the question  
*whether we have free will*

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# Is Free Will Compatible with Determinism?

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**Everything is predetermined**

We have  
free will

We don't  
have free will

# What Does it Mean To Have Free Will? *An Attempt at a Definition*

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## Free Will

This is the power to act and do otherwise. It is the power to have made a choice other than the choice one actually made.

# Is Determinism Compatible With Free Will? *It seems Not*

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An argument that determinism is incompatible with free will:

Determinism means that all events —including our own actions — happen necessarily because they are caused by previous events. If so, we do not have the power to change them and act otherwise. So, *if determinism is true, we do not have free will.*

# van Inwagen's Argument

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- *If determinism is true, then free will is impossible.* Here is why:
  1. Free will is the power to have made a different decision than the one presently made, so free will is the power to change the present.
  2. Determinism means that the present is uniquely determined by the past and by the laws of nature.
  3. So, in order to change the present, one has to change the past or law the laws of nature
  4. But one cannot change the past nor the laws of nature
  5. So, one cannot have the power to change the present, so one cannot have the power to have made a different decision.

# Is Non-Determinism Compatible with Free Will?

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- ❖ Non-determinism means that some events happen by chance or by accident as opposed to everything happening inevitably or by necessity.
- ❖ But just as we do not have the power to change what happens by necessity, we do not have the power to change what happens by chance and accident either.
- ❖ We are powerless with respect to what happens by chance and accident. *If non-determinism is true, we do not have free will.*

# Can You Change the Outcome of a Random/Chancy Event?

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The outcome of a random/chancy event is something we cannot control...

# The Puzzle About Free Will

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- ❖ If everything is predetermined in advance, then we cannot have free will.
- ❖ If *not* everything is predetermined in advance and some events happen by chance and accident, then we cannot have free will either.
- ❖ *So either way, we lack free will.* How can that be?

# Maybe We Should Think of Free Will in a Different Way. How?

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# A Definition of Free Will That Does Not Involve the Power to Do Otherwise

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*“free will [is] a set of capacities for imagining future courses of action, deliberating about one’s reasons for choosing them, planning one’s actions in light of this deliberation and controlling actions in the face of competing desires. We act of our own free will to the extent that we have the opportunity to exercise these capacities, without unreasonable external or internal pressure.”*

*Is Neuroscience the Death of Free Will?*

Eddy Nahmias, November 13, 2011, *NY Times*

# Three Definitions of Free Will

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## 1. Free Will

This is the power to act and do otherwise. It is the power to have made a choice other than the choice one actually made.

## 2. Free Will

This is the condition of being free from external or internal constraints (*see previous slide*).

## 3. Free Will

This is the awareness that everything is predetermined.

*These two definitions might render “free will” compatible with determinism. Do they?*

# Two Views

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## Incompatibilism

Determinism and free will are incompatible. If the everything is predetermined, we cannot have free will.

## Compatibilism

Determinism and free will are compatible. Even if everything is predetermined, we can still have free will.