

## Reporting Conscious States: A Neuro-phenomenological Analysis

David Gamez, Imperial College, London  
TSC 2011, Stockholm, 4<sup>th</sup> May 2011

### *Talk Overview*

- Phenomenal and physical
- Science of consciousness
- Epiphenomenalism
- Causal overdetermination
- Temporally displaced correlation

## PHENOMENAL and Physical

### *Phenomenal and Physical.*

- Science of consciousness investigates the relationship between the physical brain and phenomenal experiences.
- Phenomenological descriptions and physical measurements are the data for the science of consciousness.

### *The Phenomenal World*

- The phenomenal world is the totality of our possible and actual phenomenal experiences - texture, colour, smell, shape, taste, sound and so on.
- Includes phenomenal measurements of the physical world - the experience of looking at a brain scan or taking a reading from a thermometer.
- We can remember our phenomenal experiences and imagine them when the corresponding physical objects are not present.

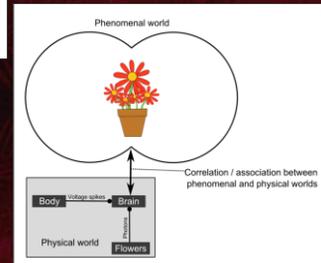
### *The Physical World*

- The physical world is completely non-phenomenal and never directly appears in the stream of experience.
- Consists of the physical entities that are deemed by physicists to constitute physical reality - quarks, wave-particles, forces, ten-dimensional superstrings and so on.
- Physical objects are also defined by other properties, such as spatial extension, mass and velocity, which can be defined mathematically and must be carefully distinguished from their phenomenal representations.

## Phenomenal and Physical

- Nothing to do with metaphysical dualism or substances.
- Two classes of observable phenomena.
- Task of the science of consciousness is to integrate these two sets of observations into a systematic theory.
- A holding back or suspension of judgement about the 'true nature' of the phenomenal and physical.

## Phenomenal and Physical



## SCIENCE of Consciousness

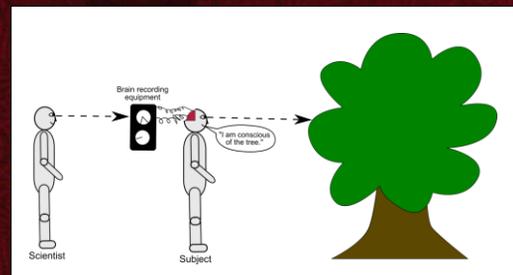
## Science of Consciousness

- Measure physical state of waking human brain.
- Measure phenomenology using behavioural reports.
- Systematically vary the waking human brain to identify correlations between the phenomenal and physical.

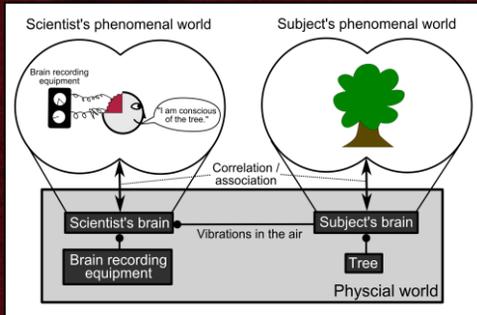
## From Correlations to a Theory of Consciousness

- When we have identified correlations between phenomenal and physical, a theory of consciousness can be developed that maps between states of the phenomenal and physical worlds.
- This enables us to make predictions about phenomenal states on the basis of physical states, and predictions about physical states on the basis of phenomenal states.

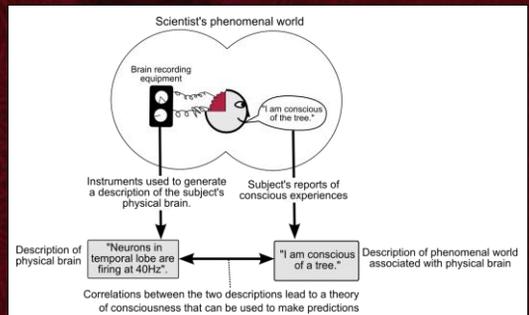
## Experiment on the Correlates of Consciousness



## The Situation of Scientist and Subject



## The Science of Consciousness



## Reporting Conscious States

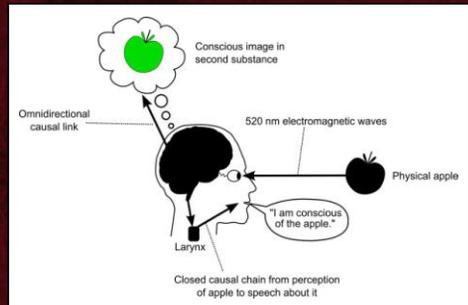
- Experiments on consciousness depend upon a link between consciousness and reports about conscious states.
- The scientist's experience of the subject's report must be *about* the subject's phenomenal experiences.
- Will now show:
  - ◆ Epiphenomenalism makes the reporting of phenomenal states impossible.
  - ◆ Need a different way of understanding the reporting of conscious states.

## EPIPHENOMENALISM

## Epiphenomenalism

- Physical world is causally closed.
- We experience red, smell of lavender, etc.
- The phenomenal world contains information about the physical world, but does not affect it at all.

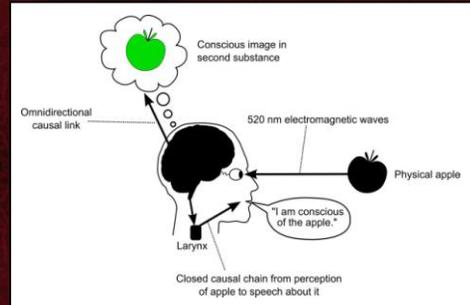
## Epiphenomenalism



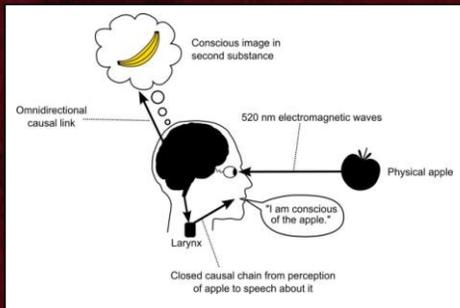
## Epiphenomenalism

- If there is only one way link between consciousness and the physical world, then consciousness cannot be described or spoken about.
- Everything that has been said by physical human beings about “consciousness” has been caused by physical events in the physical world.
- The word “consciousness” becomes meaningless

## Epiphenomenalism



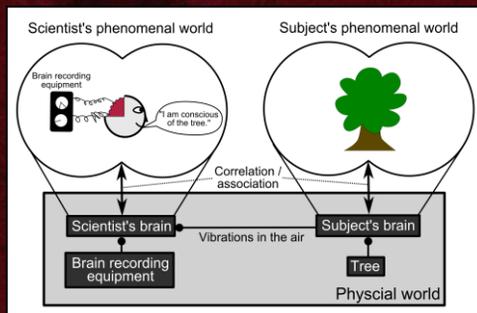
## Epiphenomenalism



## Moving on from Epiphenomenalism

- Epiphenomenalism is philosophical nonsense.
- If we want a science of consciousness, we need a connection between consciousness and physical reports about consciousness:
  - ◆ Link between consciousness and physical vibrations carrying reports about consciousness.
  - ◆ Physical vibrations must be linked to phenomenal states in the scientist's mind, conveying information about the subject's phenomenal states.

## The Situation of Scientist and Subject



## Connections Between Phenomenal and Physical

- Will examine two options:
  - ◆ Over determined causal relationships
  - ◆ Temporally displaced correlation between phenomenal states and physical sound vibrations.

# CAUSAL Overdetermination

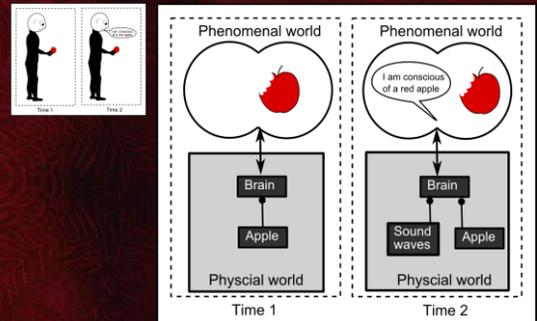
## Causal Relationships

- Potentially a number of different causal relationships between phenomenal and physical:
  - ◆ Physical → physical causation
  - ◆ Phenomenal → phenomenal causation
  - ◆ Physical → phenomenal causation
  - ◆ Phenomenal → physical causation

## Causal Relationships

- Potentially a number of different causal relationships between phenomenal and physical:
  - ◆ Physical → physical causation
  - ◆ Phenomenal → phenomenal causation
  - ◆ Physical → phenomenal causation
  - ◆ Phenomenal → physical causation

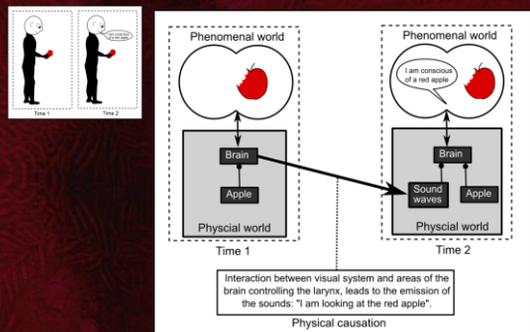
## Causal Relationships



## Physical → Physical Causation

- The physical world is causally closed.
- Any event within the physical world can be completely explained (and possibly predicted) by the set of preceding physical events.
- A conscious event is never needed to explain a physical event.

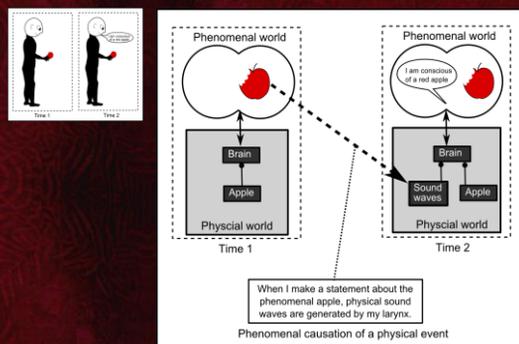
## Physical → Physical Causation



## Phenomenal → Physical Causation

- My report of conscious states has physical consequences – vibrations in the air, changes of brain state of my listeners, etc.
- A science of consciousness must claim that these physical consequences are linked to phenomenal states.

## Phenomenal → Physical Causation



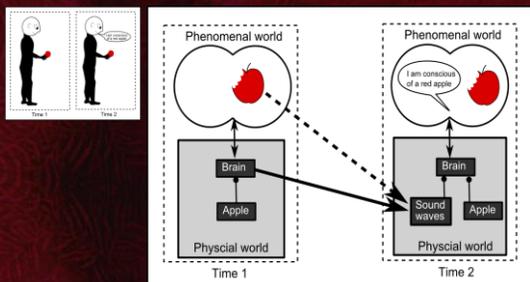
## Problem with Causal Relationships Between Phenomenal and Physical

- Seems highly likely that the physical world is causally closed.
- So the vibrations of the sound waves “I am conscious of the apple” must have been entirely caused by prior physical events (photons entering the brain, neural processing, etc.).
- The phenomenal world is never needed to explain the existence of the physical sounds “I am conscious of the apple.”

## Causal Overdetermination

- But ... we believe in the phenomenal world and want a science of consciousness.
- Also need to interpret the physical sound vibrations “I am conscious of the apple” as being caused by the phenomenal states.
- The physical sound is caused by preceding events at *both* the phenomenal and physical levels.
- It is *causally overdetermined*.

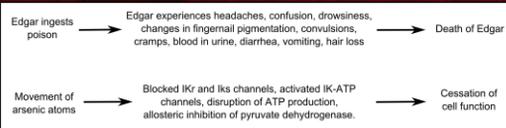
## Causally Overdetermination



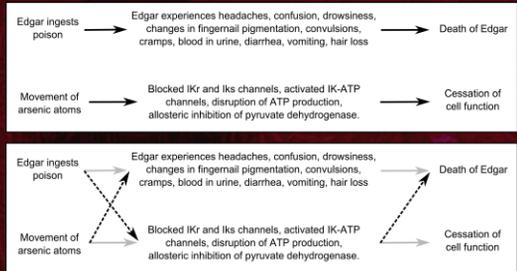
## Causal Overdetermination

- Highly problematic.
- Not dualism! Dualism rejects causal closure of physical world.
- Some similarities between causal overdetermination and causation between different levels of description of a physical system.

## Crossover Causation Between Levels of Physical Description



## Crossover Causation Between Levels of Physical Description



## General Problems with Causation

- Even simple cases of causation are problematic.
- Could make more sense to drop causation between phenomenal and physical in favour of a Humean model.

...we have no idea of connexion or power at all, and that these words are absolutely, without any meaning, when employed either in philosophical reasonings or common life.

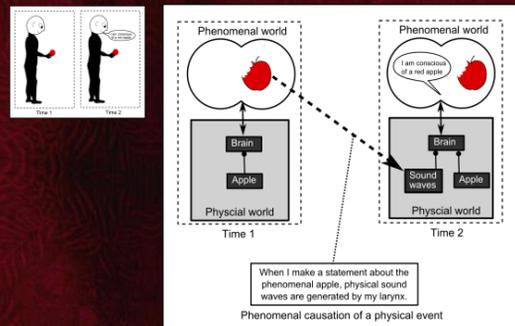
David Hume, *An Enquiry Concerning Human Understanding*, p. 49

## TEMPORALLY Displaced Correlation

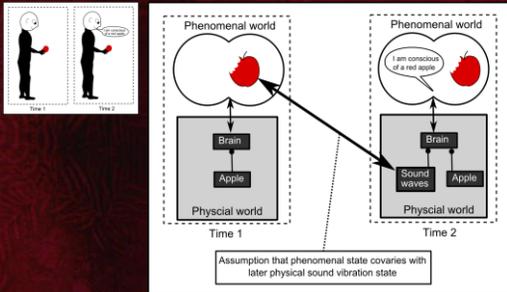
## Temporally Displaced Correlation

- Take a step back from causal models and ground science of consciousness on the assumption of temporally displaced correlation between reports about conscious states and conscious states.
- When I make the statement : "I am conscious of the red apple" my phenomenal experience of the red apple is correlated with my physical body making sound vibrations "I am conscious of the red apple" at a later point in time.

## Phenomenal → Physical Causation



## Temporally Displaced Correlation Between Phenomenal and Physical



## Temporally Displaced Correlation

- "Correlation" is intended to loosely indicate that different phenomenal states are systematically linked to different sound vibration patterns.
- Claim is that the physical vibrations are *about* an earlier conscious state because they *co-vary* with it.
- An omniscient being could measure this covariance using mutual information or similar.

## Temporally Displaced Correlation

- Has to be *assumed* and cannot be proved – it is a condition of possibility for our talking about phenomenal states.
- Can only be assumed with systems that are commonly agreed to be conscious – waking adult human brains.

CONCLUSIONS

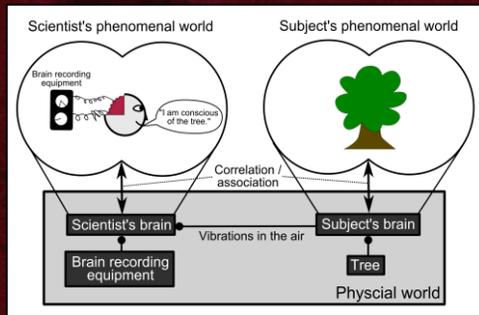
## Conclusions

- Phenomenal physical distinction and a correlation-based approach to the scientific study of consciousness.
- Raised a problem about the link between phenomenal states and physical reports about those states.
- Epiphenomenalism is philosophical nonsense.
- Causal over determination is unappealing.

## Conclusions

- Ground the science of consciousness in temporally displaced correlation between phenomenal states and physical reports.
- Must be assumed and cannot be proved.
- Could be used to account for communication about phenomenal states between systems that are agreed to be conscious.

## The Situation of Scientist and Subject



## Acknowledgements

- Research funded by grant from:
  - ♦ Engineering and Physical Science Research Council (EP/F033516/1)

## More Information

- Slides:  
[www.davidgamez.eu/talks/Gamez-TSC2011-Talk.pdf](http://www.davidgamez.eu/talks/Gamez-TSC2011-Talk.pdf)
- Papers related to this material available at:  
[www.davidgamez.eu/pages/publications/](http://www.davidgamez.eu/pages/publications/)
- Feel free to contact me if you have any questions:  
[david@davidgamez.eu](mailto:david@davidgamez.eu).