

Consciousness

Wendell Wiggins
Spring/Summer, 2009

Consciousness

Sources

- *Consciousness: An Introduction*, Susan Blackmore, Oxford University Press, 2004
- Lecturer at University of Bristol, UK, and others
- Editor: *Society for Psychical Research Newsletter*

Consciousness

Definitions

- A millisecond (ms) is $1/1000^{\text{th}}$ second

Consciousness

- What is consciousness?

Consciousness

- What is it like to be you?

Consciousness

- Is consciousness supernatural?

Consciousness

Problems

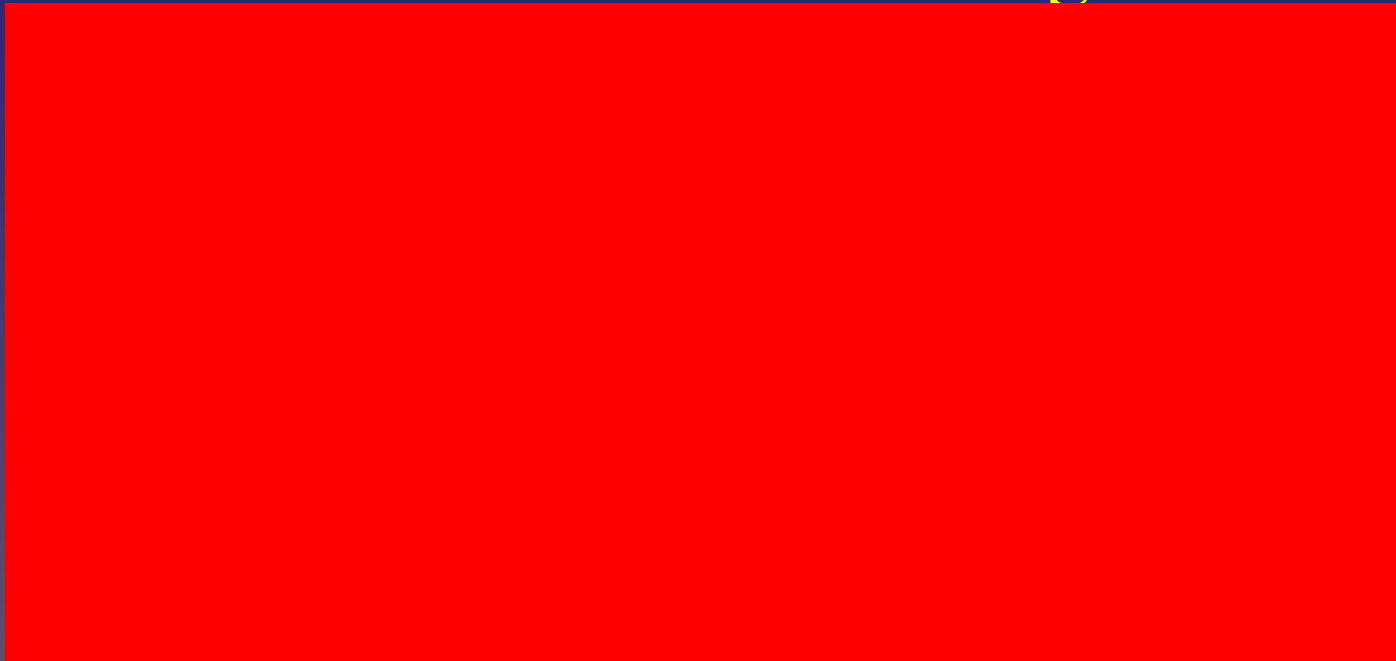
- The Hard Problem: what physical entities and arrangements produce and host consciousness?
- If you think consciousness is supernatural, what connects it to physical events?
- If you think consciousness is natural, what physical entity produces it?
- Easier problems: everything else
- Is there a Hard Problem?

Consciousness

Elements of consciousness

- Qualia(plural) or Quale(singular)

What color is this rectangle?



Consciousness

Elements of consciousness

Are zombies possible?

In the context of discussing consciousness, a zombie is a being that can do anything a normal human can do, but has no consciousness

Consciousness

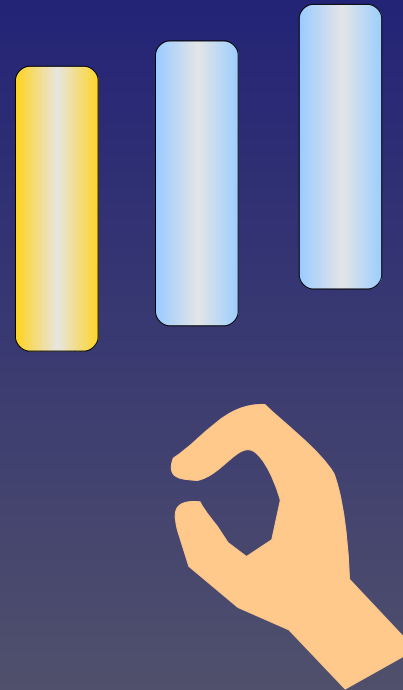
Elements of consciousness

- A subject is asked to point at a target.
- The target is moved just after the subject begins to move his arm, and while his eyes are moving (a saccade).
- The subject points accurately even though he will deny that the object moved.

Consciousness

Elements of consciousness

- What does it mean to decide to do something?
- Subject sits with thumb and forefinger touching
- Instructed to reach for and say “Tah” when a peg lights up
- Computers record the timing of movement and sound



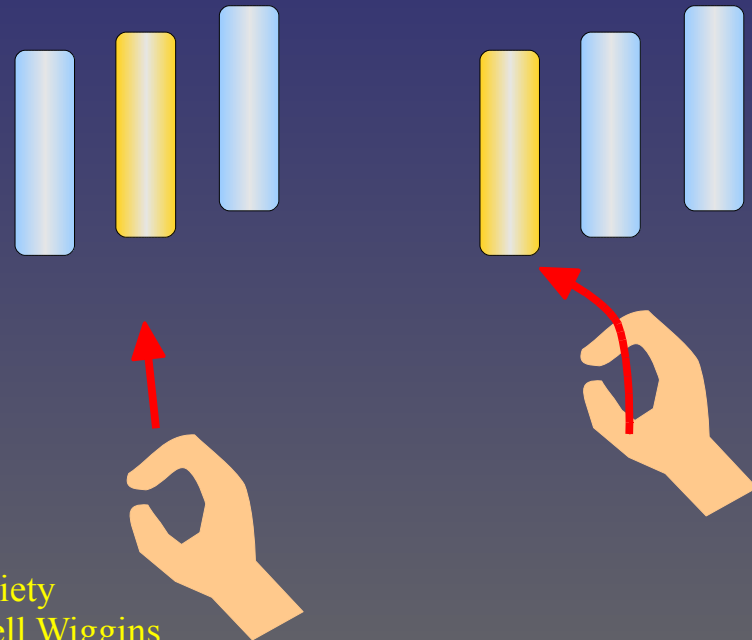
Castiello, 1991

Consciousness

Elements of consciousness

- Sometimes the light stays fixed
- Sometimes the light changes right after the subject moves
- Subjects were instructed also to say “Tah” when the light moved
- Initially, the movement preceded the sound by 75ms
- When the light moved, the arm corrected its motion by about 200 ms before the subject made the second sound

Castiello, 1991



Consciousness

Elements of consciousness

- The subjects were all having brain surgery for various reasons
- Electric pulses were applied to the somatosensory cortex and elicited a sensation of being touched somewhere on the skin as reported verbally by the subject
- No response occurred if the stimulation lasted less than 500 ms
-
- If the subject was actually touched, but the electric pulses were applied between 200ms and 500 ms after the touch, subjects were unaware
- A trained reflex happens in less than 200 ms

Libet, 1960s

Consciousness

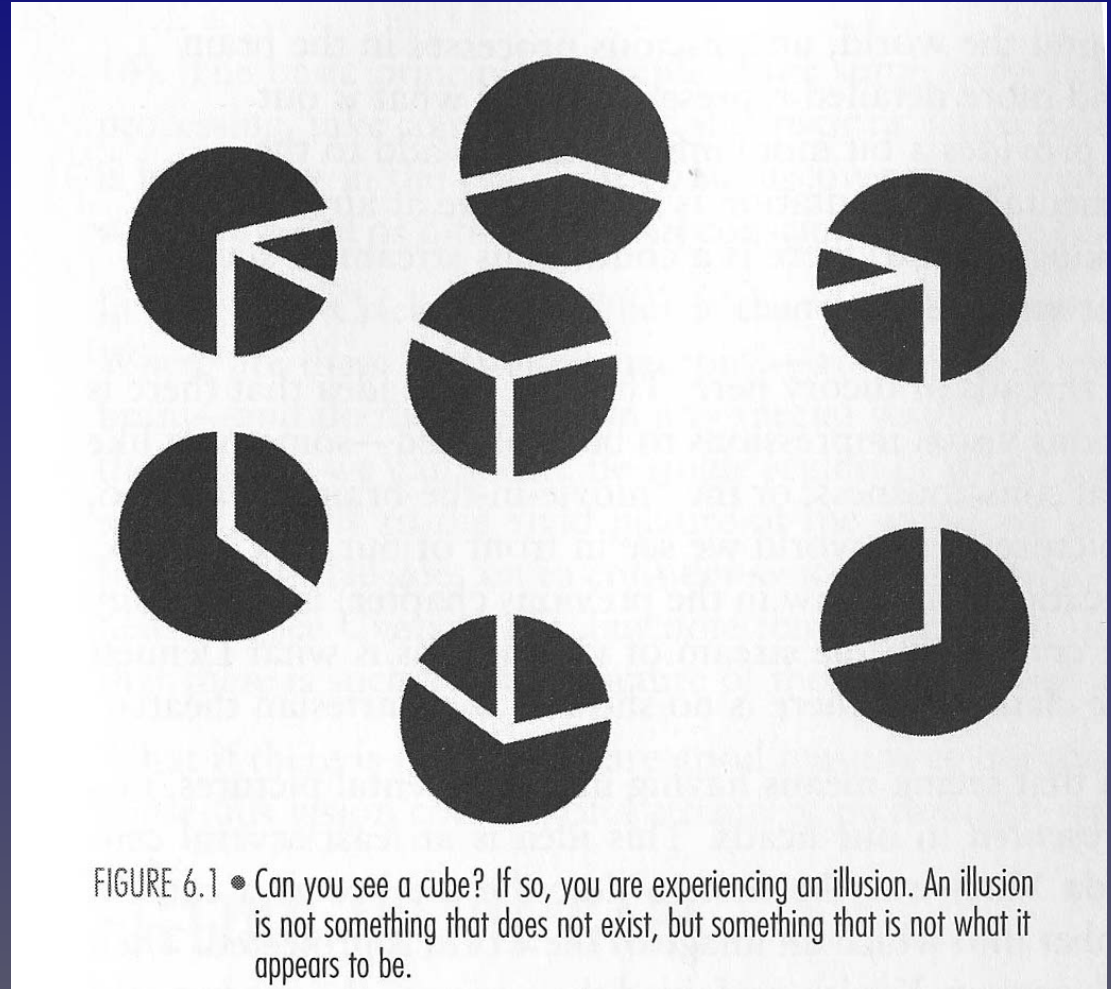
Elements of consciousness

- A stimulus requires about 500 ms to register in our consciousness, but we can react to stimuli in 200 ms or less
- We act on many stimuli unconsciously

Consciousness

The Grand Illusion

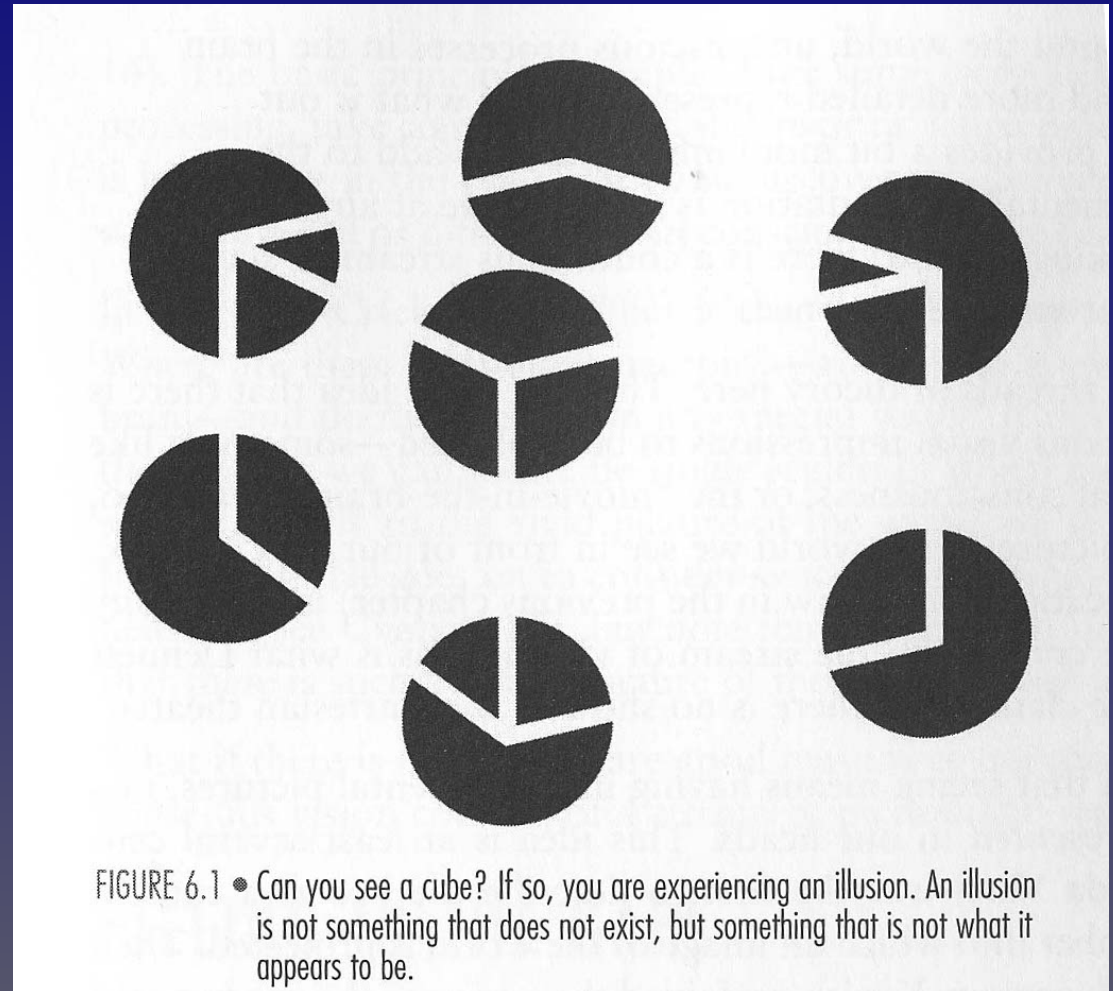
- What do you see?
- The ocular blind spot
- Change blindness



Consciousness

The Grand Illusion

- What do you see?
- The ocular blind spot
- Change blindness
-
- Pics p 87
-
- Visual encoding
- Fixation blindness
- The Gorilla
- Unconscious driving

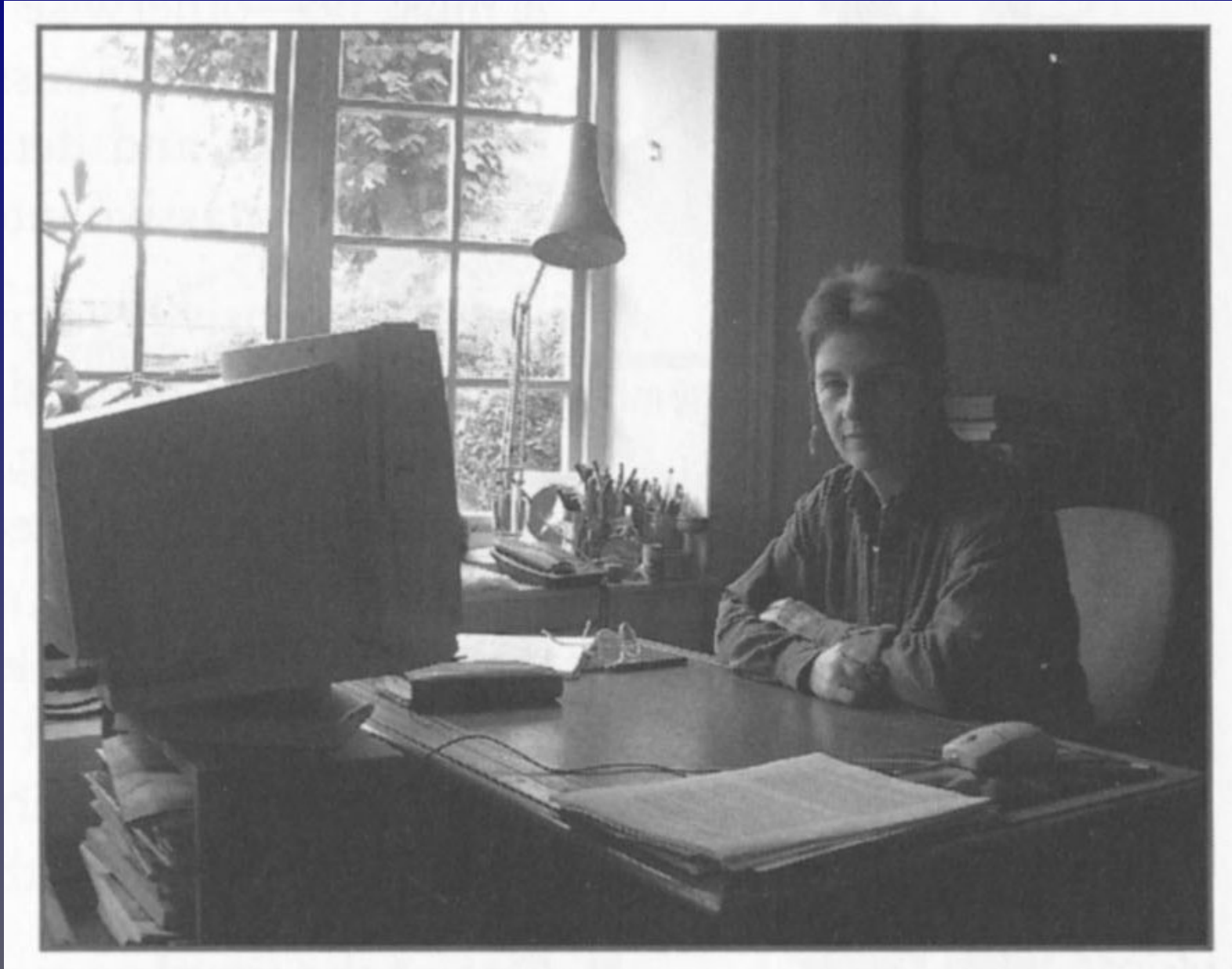


Consciousness



Science and Society
Copyright, 2009, Wendell Wiggins

Consciousness



Science and Society
Copyright, 2009, Wendell Wiggins

Consciousness

Attention

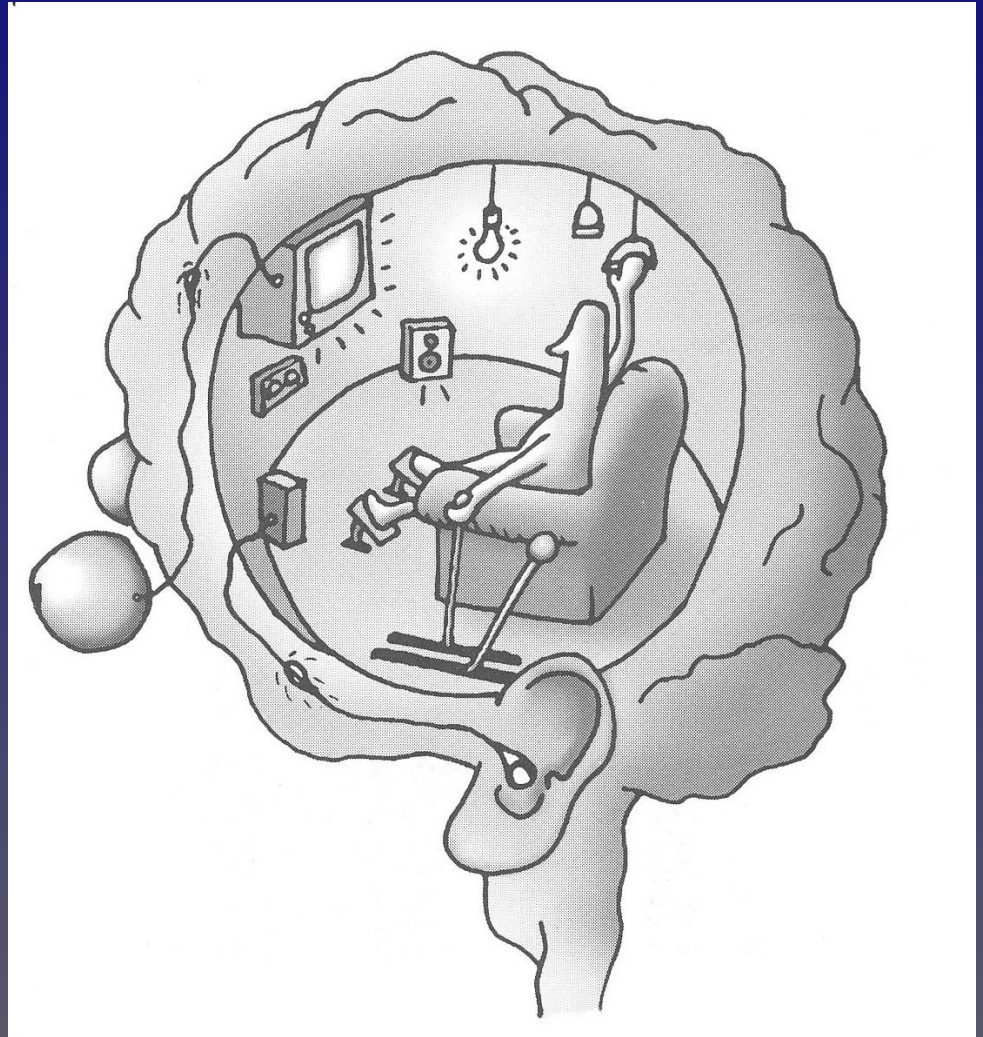
- In this video, count the **total** number of times the balls are passed
- Do not count a bounce unless the ball goes to another person
- Do not make any sounds to disturb your colleagues
- Do not make any remarks until asked
- Remember your count

Ball Tossing

Consciousness

Where is consciousness?

- The Cartesian Theater
(named after Rene Descarte by Daniel Dennett)



Consciousness

Where is consciousness?

- Subjects were shown two images of objects. Sometimes the images were two different views of the same object, sometimes different objects
- When the objects were the same, the time required to realize that was proportional to how far the object was rotated from one image to the next
- In another experiment, subjects were asked about the relation between places on a map
- Again, the time to answer was proportional to the separation of the places

Consciousness

Where is consciousness?

- Using “functional MRI” researchers can see which parts of the brain are active.
 - Looking at something activates one part
 - Listening activates another
 - Moving an arm activates another
- When subjects are asked to imagine these activities, the same parts of the brain are activated
- Imagining the pairs of images and the map exercises also took longer as the separation of the images was increased
- Imagination occurs in the same place as experience

Consciousness

Where is consciousness?

- Most current evidence indicates there is no “Cartesian theater”
- Consciousness appears to be the sum of the brain's functions, not a separate piece
- These lines of evidence suggest that there is no Hard Problem

Consciousness

Multiple personalities

- On 17 January, 1887, Ansel Bourne vanished from Pawtucket, Rhode Island
- Two weeks later, A.J. Brown opened a shop in Norristown, Pennsylvania
- At 5 am on 14 March, he woke up to the sound of an explosion (that no one else heard) and couldn't figure out where he was or who he was
- Such an occurrence is called fugue (a succession of different voices or instruments, in music)
- His case was apparently authentic, but many sensational cases since then have been proven a charade
- How can a single person have multiple consciousnesses?

Consciousness

Multiple personalities

- The halves of the brain are sometimes split because of an accident
- They are sometimes split to treat epilepsy.
- Each half of the brain gets input from one eye (opposite side)
- Movement functions are similarly sided
- Speech functions are only on the left side
- If the subject is shown an object to his right eye, he can say what it is
- If shown to the left, eye, he cannot say it.
- He can respond to either side using the matching hand
- Each side remembered independently what it had seen
- One side can play a number guessing game with the other

Consciousness

Conscious will

- Seances and ouija boards
- Conscious control appears to be at a very high level
- Actions can be at a low level or high
 - Reflex action to heat
 - Unconscious willed actions
 - Consciously willed actions

Consciousness

Free will and creativity

- If our mental functions are all determined by physics, can we have free will?
 - What is free will?
 - Does it have to be nonphysical?
- Do you ever make a decision or act without conscious attention?
 - Getting out of bed?
- How can we have a completely new idea?

Consciousness

Completely new ideas

- Have you ever seen a cloud that looks like a bear?
- Why do we *make believe*?
- Is it a bear? How do you know?
- Pattern recognition plus analysis produces new ideas
- Einstein and general relativity

Consciousness

Paranormal occurrences

- Telepathy, clairvoyance
- Seeing the future
- Telekinesis
- Auras

- Controlled experiments. J.B. Rhine
 - On faculty at Duke University
 - Performed controlled experiments to detect paranormal events
 - Some experiments seemed to show positive results, but none ever survived repetition and careful analysis

- The power of personal experience is enormous

- No experiment has ever conclusively shown paranormal events

Consciousness

Dreams and ASCs

- What are dreams?
- Altered States of Consciousness (ASC)
- Hypnosis
-
- Near death experiences

Consciousness Evolution

- Why have we evolved consciousness?
- Blindsight
- Memes

Consciousness

Evolution

Are nonhuman animals conscious?

Consciousness

Mind and machines

- Can a machine be conscious?
- Can a machine be intelligent?
- Can a machine learn?
 - Back up a tractor trailer
 - Loan approval
 - Speech recognition
- The Turing Test
- Neural transfer to machines

Consciousness

Mind and machines

- How would you judge a machine's level of consciousness?
 - ELIZA
 - Chess players

Consciousness

Summary

- The story is unfinished
- We seem to have no central theater
- Conscious processes take place in the same parts of the brain as unconscious ones
- Multiple consciousnesses can occupy a single brain
- There is no evidence for a supernatural component of consciousness and processes in the brain can explain everything consciousness does.
- A purely physical explanation of consciousness accounts for all the emotions and character traits we treasure.