



Review of *Consciousness: Creeping up on the Hard Problem* by Jeffrey A. Gray

Evgenii Rudnyi, Embryo Physics Course, 11 April 2012  
<http://blog.rudnyi.ru>

# About me

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- ▶ Working for CADFEM
  - ▶ Earning my bread by means of simulation (ANSYS)
- ▶ Normal science
  - ▶ Chemical Thermodynamics: <http://evgenii.rudnyi.ru/publications.html>
  - ▶ Numerics: <http://MatrixProgramming.com>
  - ▶ Model Reduction: <http://ModelReduction.com>
- ▶ Science as a hobby
  - ▶ Artificial Life, Free will, Consciousness, etc.
  - ▶ Mind-Body Problem: Everything list  
<http://groups.google.com/group/everything-list>

# Jeffrey A. Gray (1934 - 2004)

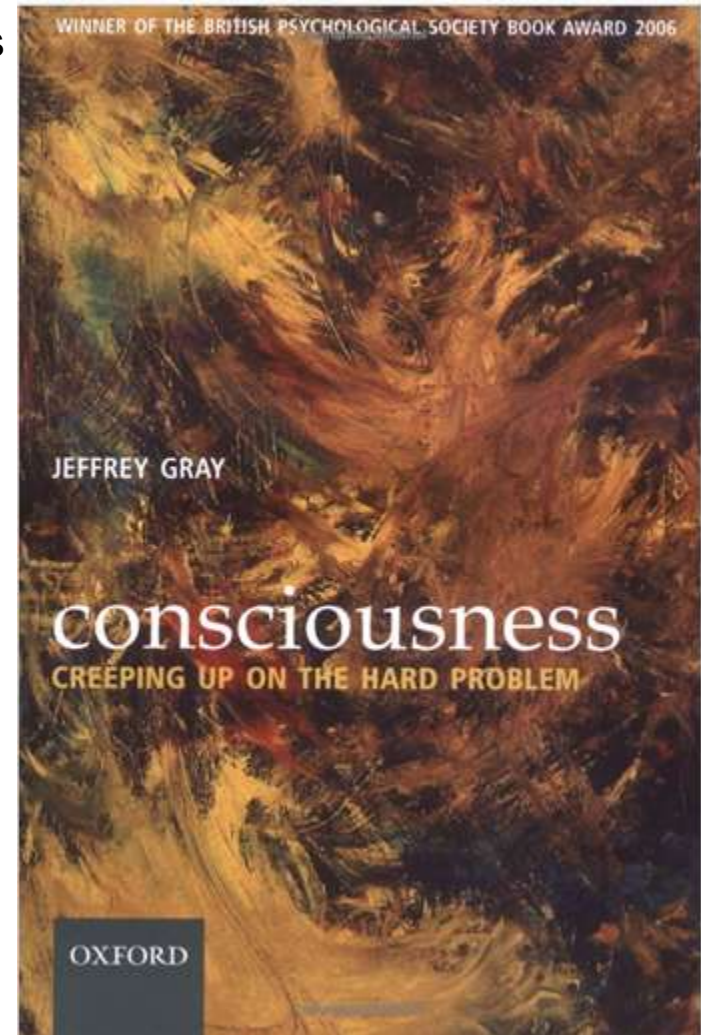
<http://users.ecs.soton.ac.uk/harnad/jeffrey.html>



- ▶ Google Scholar: citations of Gray's books
  - ▶ The neuropsychology of anxiety – 3159
  - ▶ The psychology of fear and stress – 2247
  - ▶ Elements of a two-process theory of learning – 444
  - ▶ Pavlov's typology – 184
  - ▶ Consciousness: Creeping up on the hard problem - 135

# Book, 2004

1. Stances towards the problem of consciousness
2. The illusory narrative of consciousness
3. Where science and consciousness meet
4. Intentionality
5. Reality and illusion
6. Enter qualia
7. A survival value for consciousness?
8. Creeping up on the hard problem
9. Epiphenomenalism revisited
10. Scrutinizing functionalism
11. From Cartesian theatre to global workspace
12. The global neuronal workspace
13. The neural correlate of consciousness
14. Bottom-up vs top-down processing
15. Egocentric space and the parietal lobes
16. Taking physics seriously
17. Consciousness of self: the point of view
18. The bodily senses
19. Responsibility
20. Overview



# Stances Towards the Problem of Consciousness

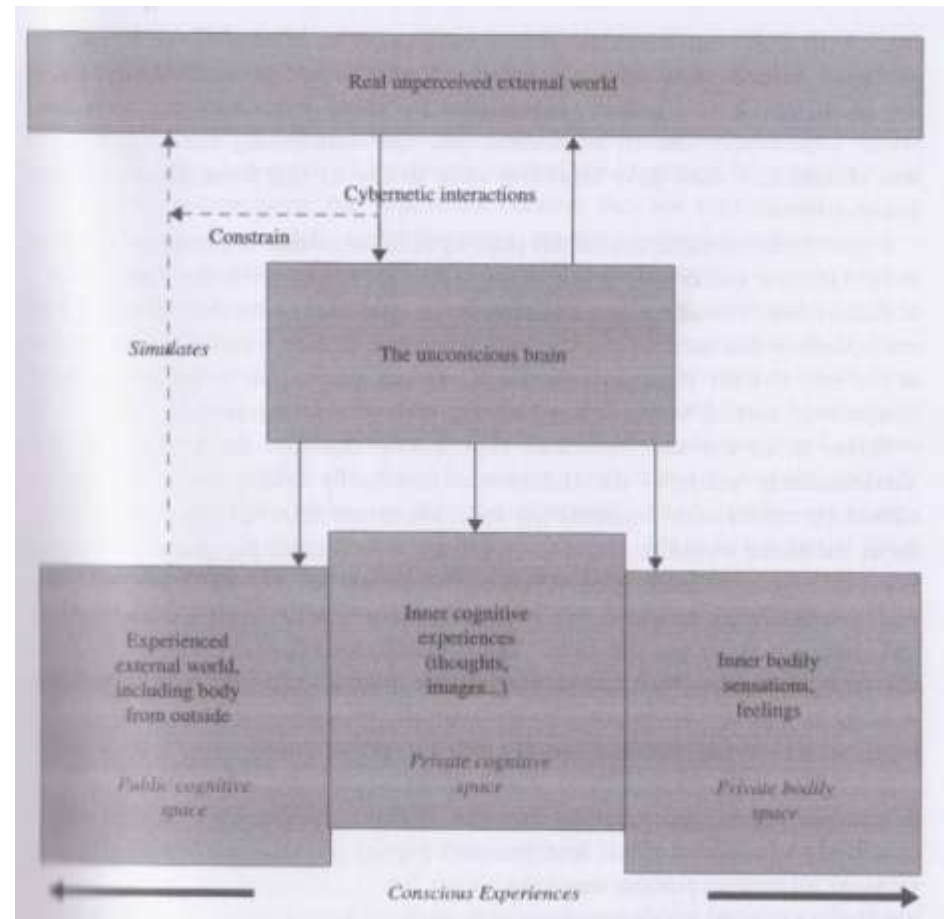
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- ▶ 1) Naive
  - ▶ Taking conscious experience for granted
  - ▶ Daily business
- ▶ 2) Normal Science
  - ▶ Consciousness is not Hard Problem
  - ▶ Behaviorism, functionalism, etc.
- ▶ 3) New Theory
  - ▶ Consciousness is Hard Problem
  - ▶ New scientific theory is required
- ▶ 4) Non-scientific
  - ▶ 4A) Hard Problem is due to sloppy thinking
  - ▶ 4B) Consciousness is spiritual, mystical

# Consciousness as a Phenomenon

► *“Useful definitions come along after the problem is solved, not before” (cf. with electricity by ancient Greeks)*

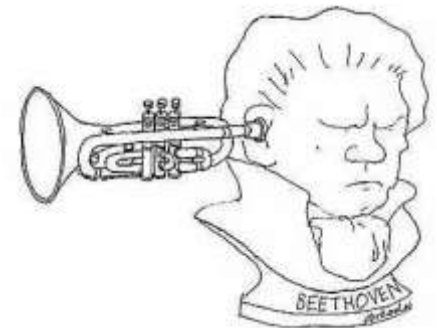
- Unconscious phenomena
- Conscious phenomena
- The unconscious brain prepares conscious experience
- Experienced external world is a reconstruction



# Examples of Conscious Experience

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- ▶ Consciousness == Conscious Experience
- ▶ Visual 3D reconstruction of the external world
  - ▶ Image recognition and 3D reconstruction is not Hard Problem
  - ▶ Hard Problem is how conscious 3D experience is created
- ▶ Music
  - ▶ Sound vibrations is not yet music
  - ▶ Deaf Beethoven was able to create music
- ▶ Synaesthesia
  - ▶ e.g. experience of color from speech
- ▶ Feelings (e.g. enjoying nature)



<http://www.litemagazine.com/2009/02/did-you-hear-something-the-world%e2%80%99s-first-concert-for-the-deaf/>



# Consciousness and Illusions

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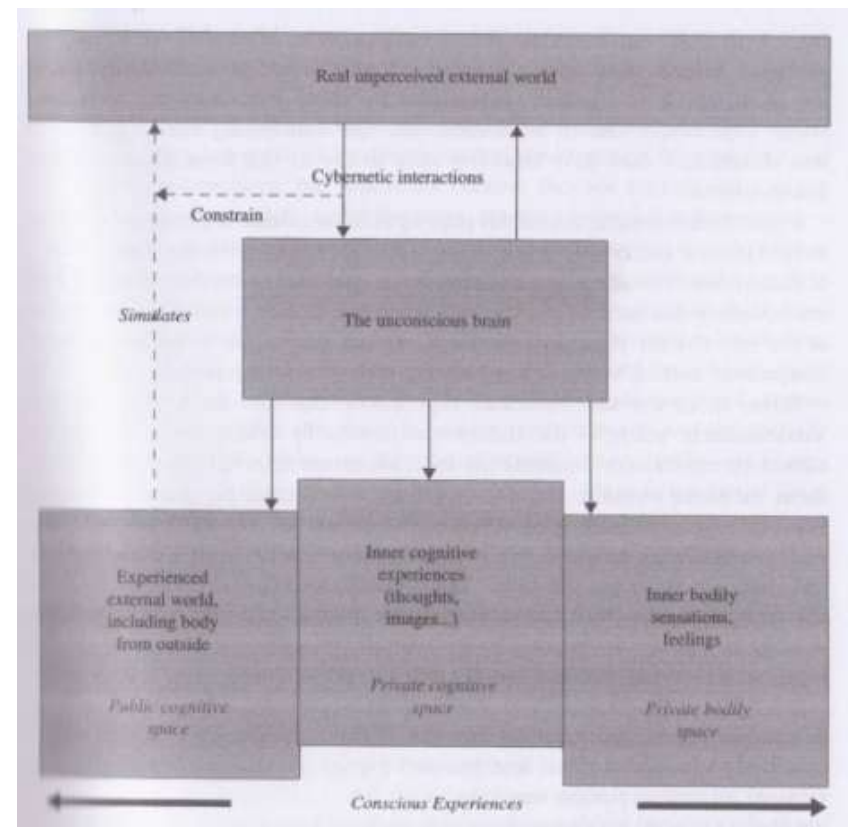
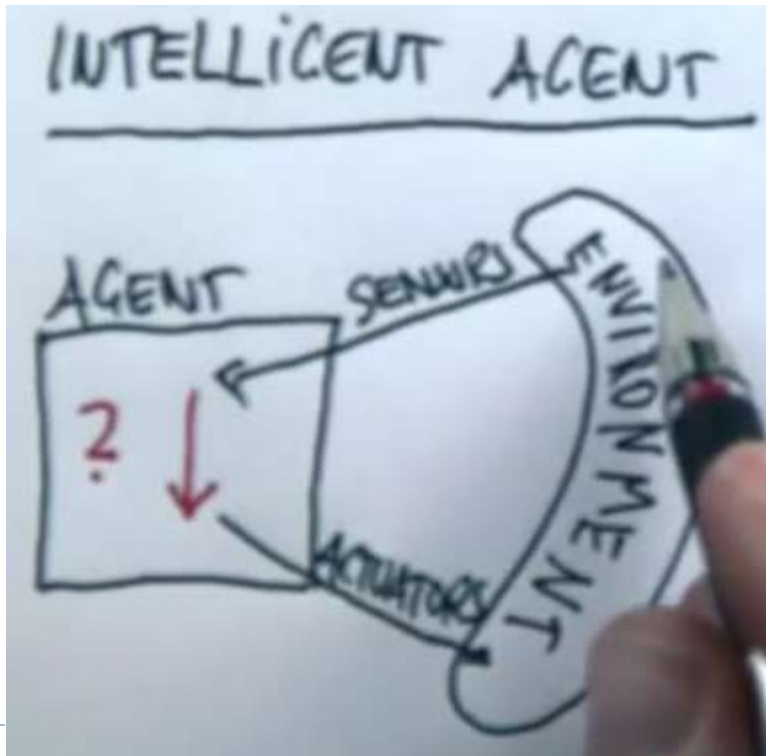
- ▶ *“I perceived this out there, and so I then did that”*
  - ▶ Consciousness comes too late (250 ms to construct it)
    - ▶ Unconscious reactions are much faster
  - ▶ The world is inside the head
  - ▶ Visual illusions
    - ▶ 3D reconstruction from a computer screen
  - ▶ Illusions of the will
- ▶ *“Much of your conscious life is illusory.”*
- ▶ *“Whatever may be an illusion, the fact that you have a conscious life cannot be.”*
- ▶ *“No consciousness, no possibility of illusions”.*



# Consciousness and Intellect

- ▶ Conscious experience has nothing to do directly with intellect, language and self experience
- ▶ Artificial Intelligence

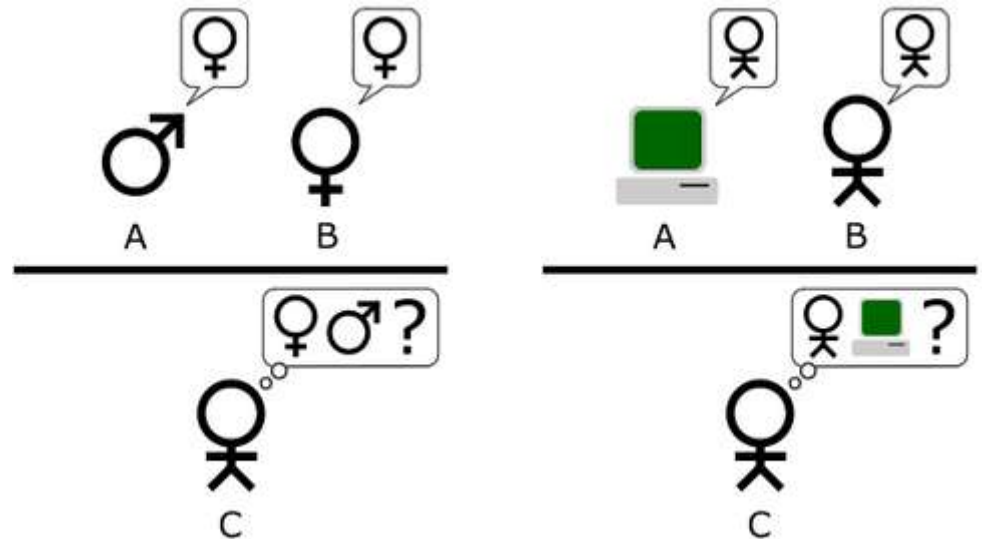
▶ <http://www.ai-class.com/>



# Consciousness and Turing Test

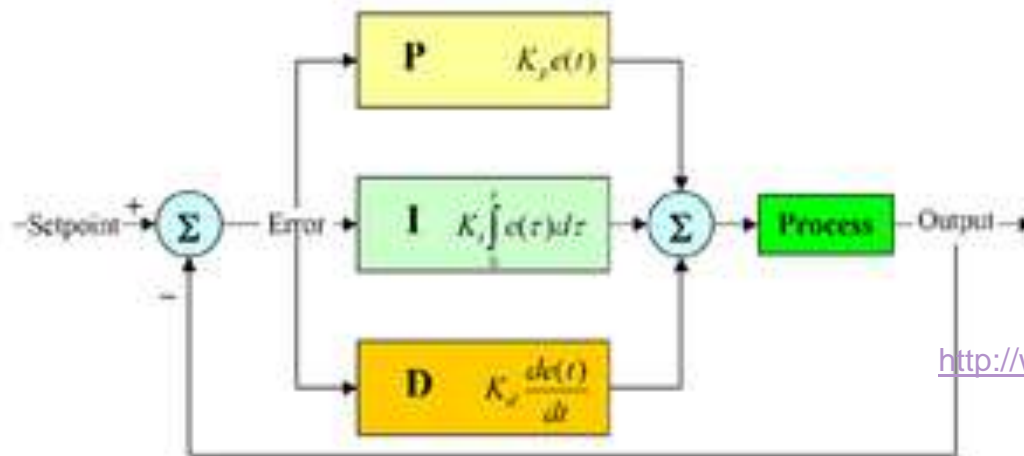
- ▶ Victorian game
  - ▶ To distinguish between a man and a woman
- ▶ Alan Turing
  - ▶ To distinguish between a man and a computer
- ▶ Test on Artificial Consciousness?

[http://en.wikipedia.org/wiki/Turing\\_test](http://en.wikipedia.org/wiki/Turing_test)



# Reducing Biology to Physics and Chemistry

- ▶ Organism and evolution as feedback mechanisms
- ▶ Biology = Physicochemical laws + Cybernetics laws
- ▶ Servomechanism



<http://www.eoearth.org/article/Organism?topic=49480>

[http://en.wikipedia.org/wiki/PID\\_controller](http://en.wikipedia.org/wiki/PID_controller)

# Reducing Consciousness to Physics and Chemistry

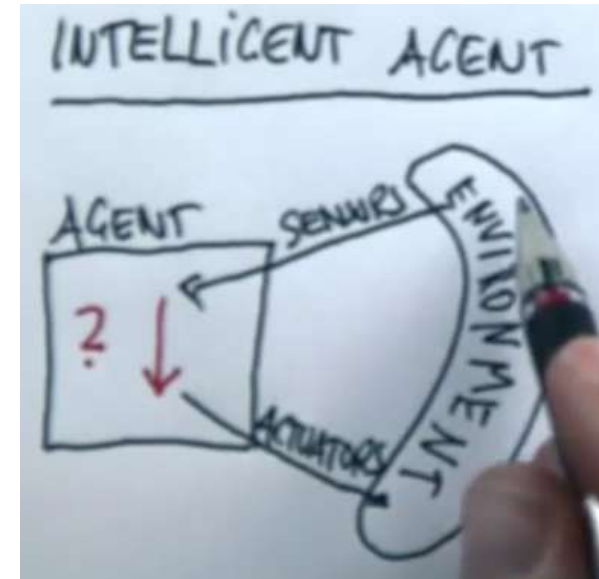
## ▶ Searle's model:

- ▶ Micro elements and macro properties
- ▶ From atoms to solidity and liquidity
- ▶ From neurons to consciousness?

## ▶ Searle's model does not work

## ▶ Scientific story goes seamlessly from sensory inputs to behavioral output

- ▶ No need for consciousness
- ▶ Consciousness more as an embarrassment

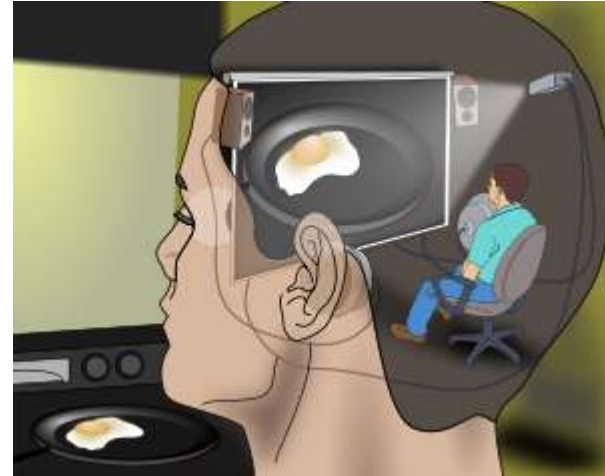


<http://www.ai-class.com/>

# Binding Problem of Conscious Experience

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- ▶ **Multimodal**
  - ▶ Cartesian theater
- ▶ **Intramodal**
  - ▶ Vision: a red kite



[http://en.wikipedia.org/wiki/Cartesian\\_theater](http://en.wikipedia.org/wiki/Cartesian_theater)



<http://www.life123.com/hobbies/scrapbooking/kites/how-to-make-kite.shtml>

# Qualia

- ▶ *“Qualia are exclusively perceptual”*
- ▶ **Zombie**
  - ▶ A human being without qualia (conscious experience)
- ▶ *“There are no behavioral tests by which we can distinguish whether a computer, a robot or a Martian possesses qualia.”*



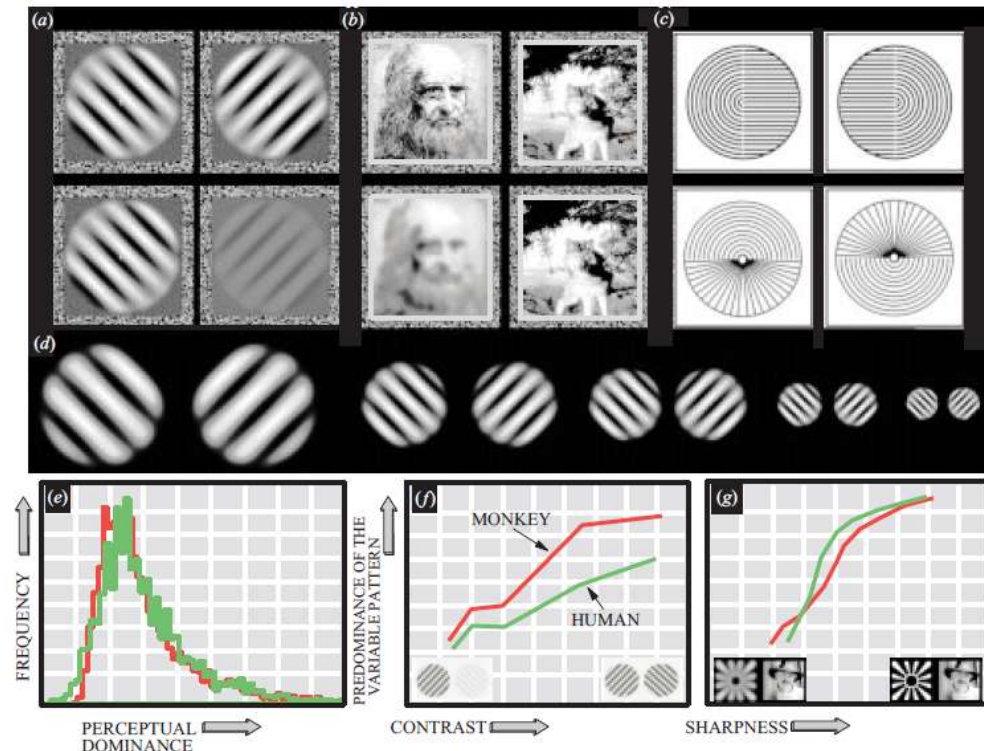
*“If I can’t feel love, what was the point of making me so damn good-looking?”*

<http://www.cse.buffalo.edu/~rapaport/719/csnessrdgs.html>



# Consciousness in Animals?

- ▶ Binocular rivalry
  - ▶ If someone experiences binocular rivalry, then he/she has conscious visual perception.
- ▶ A monkey has binocular rivalry
- ▶ “*But we can, I believe, safely assume that mammals possess conscious experience.*”

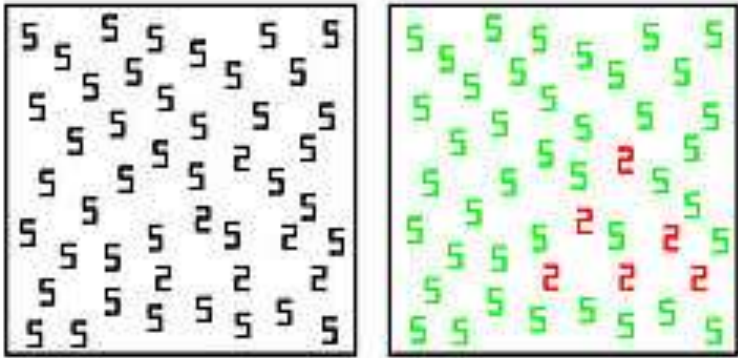


N K Logothetis, Single units and conscious vision.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1692419/>



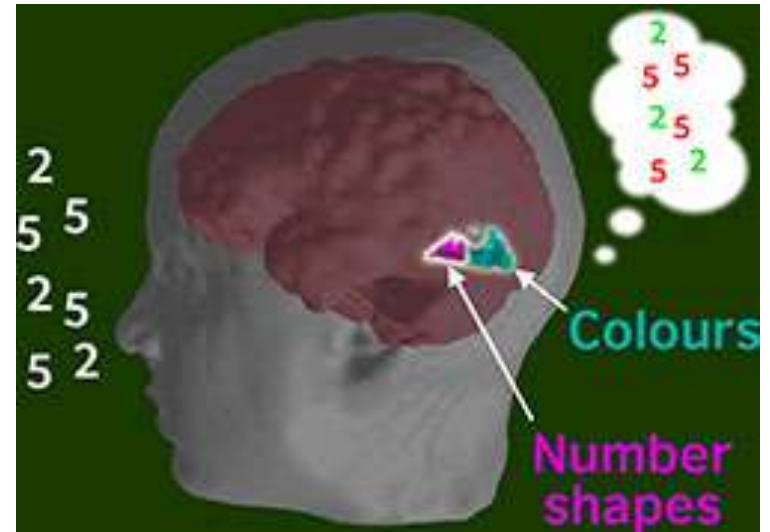
# Synaesthesia



<http://en.wikipedia.org/wiki/Synaesthesia>



<http://news.bbc.co.uk/2/hi/8248589.stm>



[http://www.scifun.ed.ac.uk/pages/about\\_us/shows\\_synaesthesia.html](http://www.scifun.ed.ac.uk/pages/about_us/shows_synaesthesia.html)

# Synaesthesia

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- ▶ *“These experiments demonstrate yet again, by the way, that the ‘privacy’ of conscious experience offers no barrier to good science. Synaesthetes claim a form of experience that is, from the point of view of most people, idiosyncratic in the extreme. Yet it can be successfully brought into the laboratory.”*
- ▶ Synaesthesia cannot be explained by functionalism.

# Dysfunctions in Brain

## ► Agnosias



<http://alfin2100.blogspot.de/2010/08/peepholes-into-coherent-world.html>



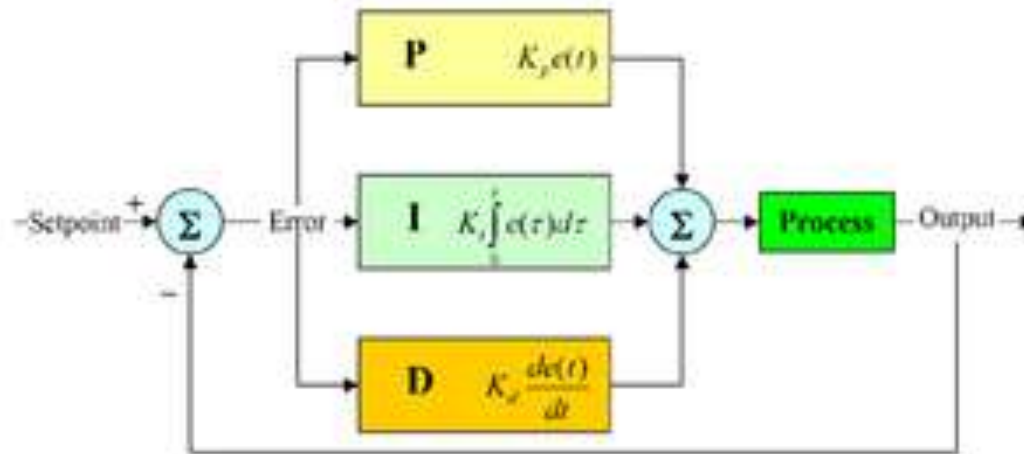
<http://www.wellsphere.com/bioethics-article/recently-a-team-in-cambridge-ha/350599>



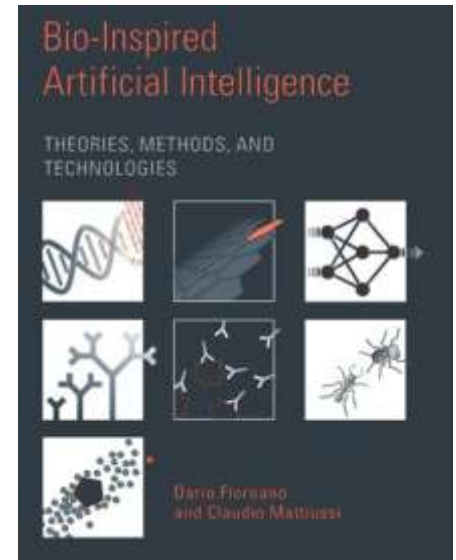
<http://visionpsicologica.blogspot.de/2008/09/mi-mundo-con-agnosias.html>

# Consciousness as Late Error Detection

- ▶ There are many small feedback mechanisms (servomechanisms)
  - ▶ They must be coordinated



[http://en.wikipedia.org/wiki/PID\\_controller](http://en.wikipedia.org/wiki/PID_controller)

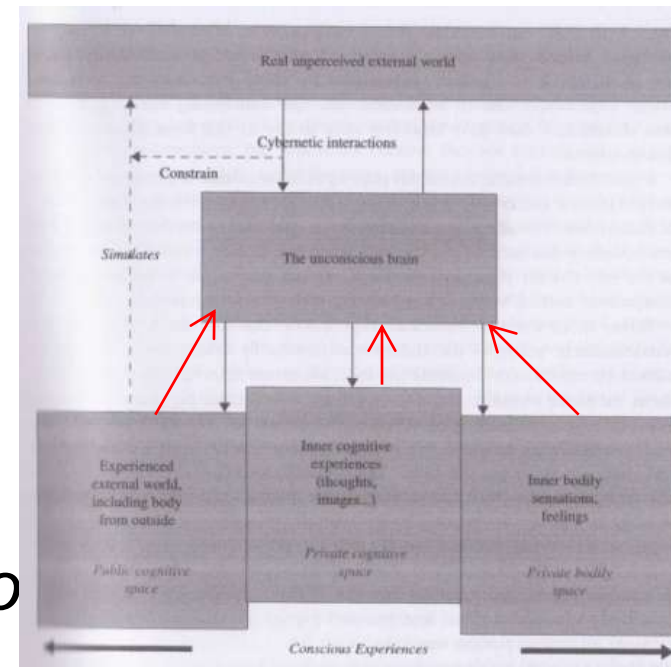


See chapter about  
Immune Systems

- ▶ “Consciousness acts as a medium of display”
  - ▶ Multifunctional, multimodal, and multipurpose comparator

# Casual Role of Consciousness

- ▶ “(1) *the unconscious brain constructs a display in a medium, that of conscious perception, fundamentally different from its usual medium of electrochemical activity in and between nerve cells;*”
- ▶ “(2) *it inspects the conscious constructed display;*”
- ▶ “(3) *it uses the results of the display to change the working of its usual electrochemical medium.*”



# Conscious Experience and Reality

- ▶ *“For the good fit between conscious experience and outside reality, the idealist philosopher Berkley called in God. In this more materialist age, it is Evolution that we must thank.”*



[http://de.toonpool.com/cartoons/just%20confusing%20evolution%20god\\_41733](http://de.toonpool.com/cartoons/just%20confusing%20evolution%20god_41733)



# Would be Theories of Consciousness

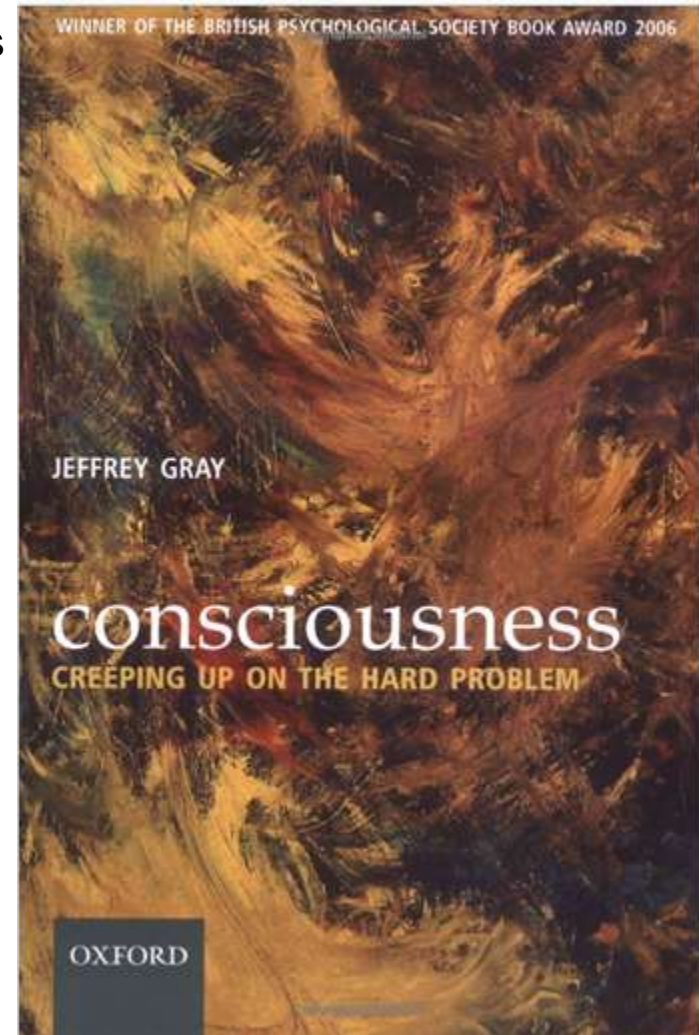
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- ▶ *“Might it be the case that, if one put a slice of V4 in a dish in this way, it could continue to sustain colour qualia?”*
- ▶ Normal Science: New kind of functionalism
- ▶ Dualism
  - ▶ Everything list: Chu spaces: Vaughan Pratt, *Rational Mechanics and Natural Mathematics*
- ▶ Panpsychism
  - ▶ Quantum Consciousness (protoconscious qualia)



# Book, 2004

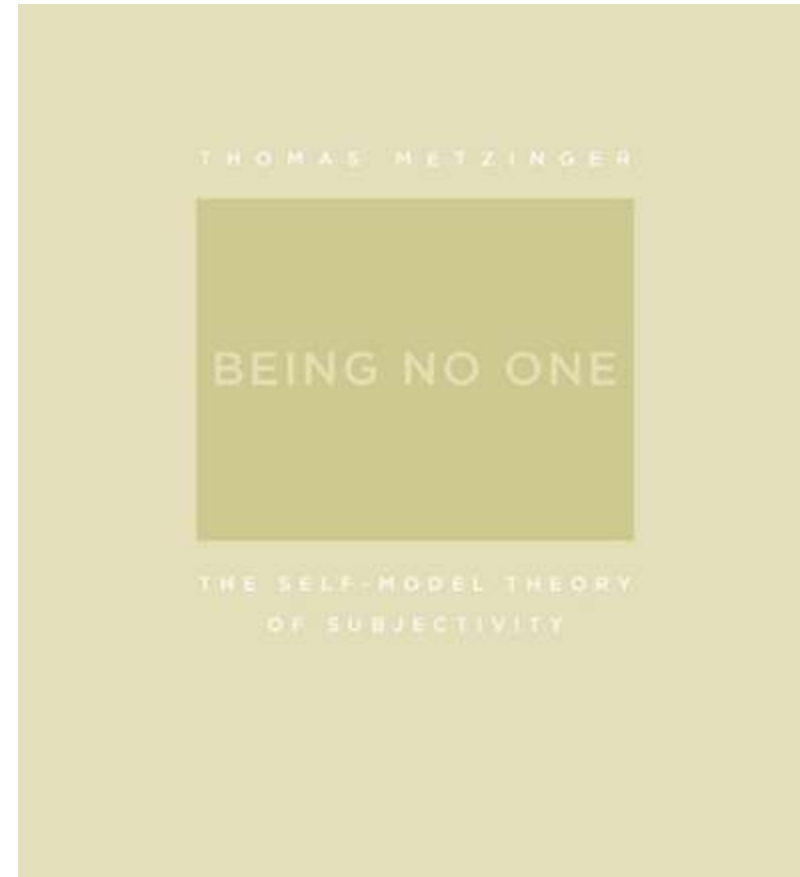
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# Thomas Metzinger, Being No One

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- ▶ Attributes of conscience experience
- ▶ *'"Autoepistemic closure" is an epistemological, and not (at least not primarily) a phenomenological concept. It refers to an "inbuilt blind spot", a structurally anchored deficit in the capacity to gain knowledge about oneself.'*



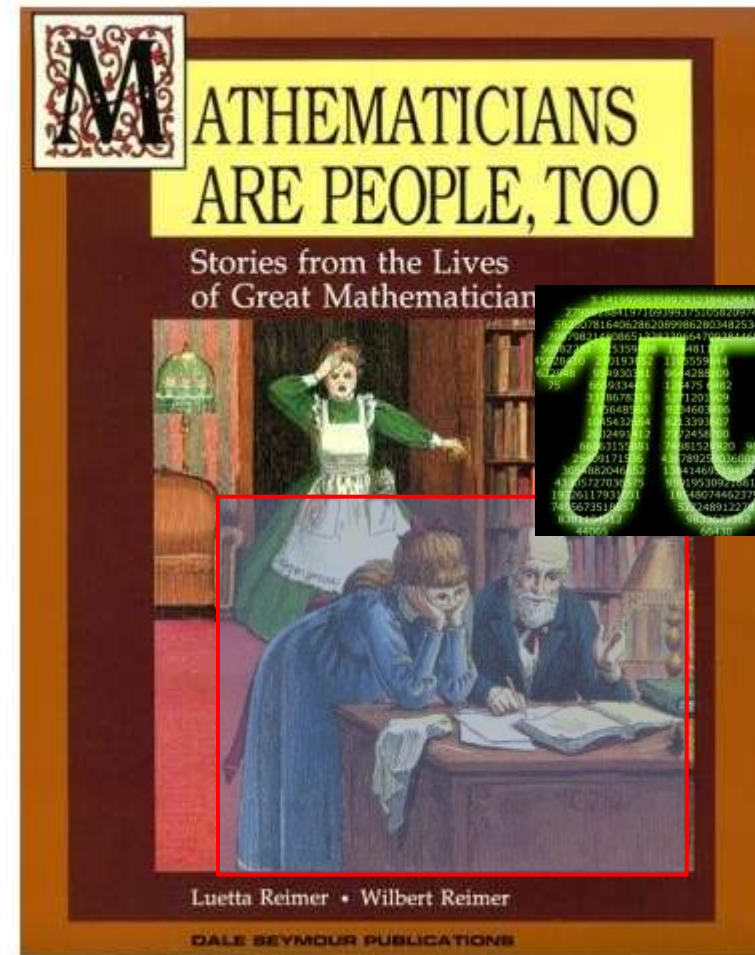
# Normal Science is Physicalism

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- ▶ Definition from Stanford Encyclopedia of Philosophy
  - ▶ <http://plato.stanford.edu/entries/physicalism/>
- ▶ *“Physicalism is the thesis that everything is physical, or as contemporary philosophers sometimes put it, that everything supervenes on, or is necessitated by, the physical.”*
- ▶ *“Physicalism is sometimes known as ‘materialism’; indeed, on one strand to contemporary usage, the terms ‘physicalism’ and ‘materialism’ are interchangeable.”*

# Two mathematicians in a bunker and existing of Pi

- ▶ <http://blog.rudnyi.ru/2012/03/two-mathematicians-in-a-bunker.html>
- ▶ Two mathematicians prove existence of Pi in a closed bunker and then die.
  - ▶ Local thermal death of Universe
- ▶ Physicalism:
  - ▶ A closed dynamical system.
- ▶ What happens with Pi?
- ▶ Was Pi in the bunker at all?
- ▶ Is Pi invariant to this dynamical system?



Pi from <http://www.theoriginof.com/pi.html>

# One more experiment as conclusion

- ▶ A dinner for one in a restaurant.
- ▶ You can enjoy food and think it over.
  - ▶ How brain constructs the multimodal representation of a glass of wine?
  - ▶ Do you enjoy your dinner alone?
    - ▶ Does cheese, fruits, wine enjoy it too?



[http://cdn.fuersie.de/bilder/gallery\\_big/sites/default/files/storybilder/kaeseplatte\\_1.jpg](http://cdn.fuersie.de/bilder/gallery_big/sites/default/files/storybilder/kaeseplatte_1.jpg)



<http://www.pizza-rosenheim.de/>

<http://embryogenesisexplained.com/>



# More Information:

<http://blog.rudnyi.ru/tag/jeffrey-a-gray>

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- ▶ Computers have emotions
- ▶ Biology and Physics
- ▶ A survival value for consciousness
- ▶ What is conscious experience?
- ▶ Thermostat Feels Cold
- ▶ Monkey have conscious visual perception
- ▶ Consciousness: Creeping up on the Hard Problem
- ▶ Evolution vs. God