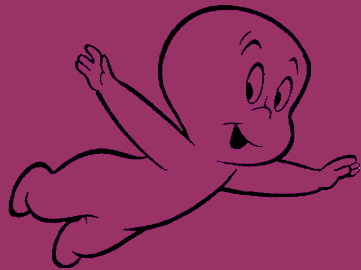


**Computers, Brains and Minds:  
Where are the ghosts within the machines?**



**European Conference on Computing and Philosophy  
ECAP 2009, 3<sup>rd</sup> July, Barcelona, Spain**

**Anja Stemme, Gustavo Deco, Stefan Büttner**



# Mind and other ghosts

"... Descartes' **ghostly** res cogitans ..."  
(Daniel Dennett, 1991)

"... something is essentially wrong with the concept of pure **ghosts**..."  
(Ansgar Beckermann, 1999)

"... there is no room for a mental '**ghost** in the machine' ..."  
(David Chalmers, 1996)

"... how can **mind stuff** do both: be physically undetectable but control the body..."  
(Daniel Dennett, 1991)

What do we mean by "mind"?

# Mind and other ghosts

*Perspectives in the age of science*

*Computers and Brains*

*Ghosts and Machines*

What do we mean by "mind"?

# Descartes' Substances

"Matter"

(infinitely) divisible

extended

that which is perceived

changes  
constituted of "parts"  
"Accidentien"

my brain,  
provides nerves for "soul",  
moves "soul"

excitation in the brain

"Mind"

indivisible

not extended

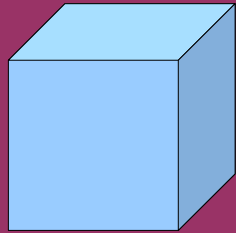
that which,  
doubts, feels, perceives etc.

stays the same  
even if it feels, wants, etc  
something else

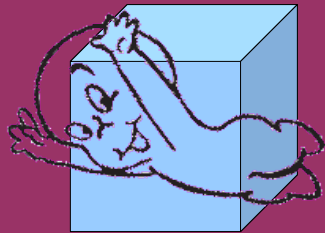
my "self"  
perceptions,  
sensations

experienced pain in the foot

# Descartes' Substances



"Matter"



"Self"

Perceptions

Sensations

?

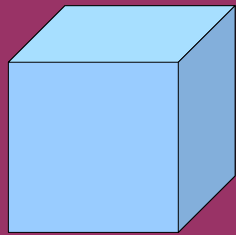


"Mind"

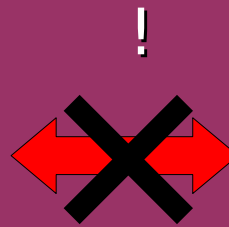
Caspar may either move XOR pervade matter!

Physical world is causally closed!

# Descartes' Substances



"Matter"



"Self"

Perceptions

Sensations

~~"Mind"~~

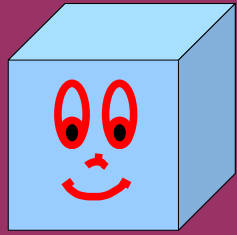


"Self"?

Perceptions?

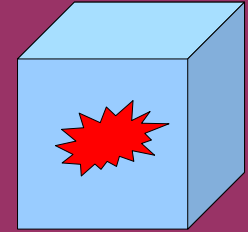
Sensations?

# Modern Approaches: Mind in a physical universe



1-Person-Perspective

*Meanings?!*



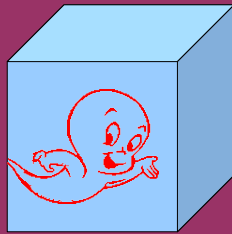
Nobody at home in the brain

Phenomenal States

Self is a fiction

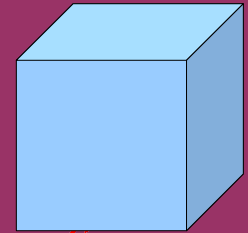
Quale

Intentionality



Biological Process

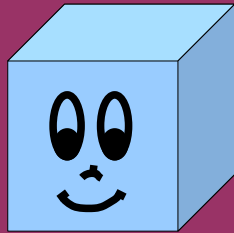
**Homunculus!**



Property Dualism

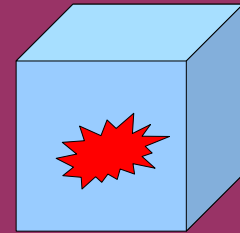
# No mind in a physical universe?

Emperical evidence!



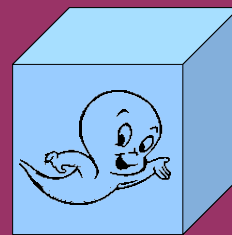
No „higher -order“ self!  
Neglect  
Anosognosia

...



No Quale:  
Colour Phi  
Change Blindness

...

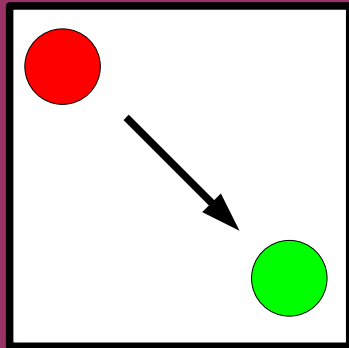


Find the "NCC":  
Gestalt-Switching  
Visual Perceptions

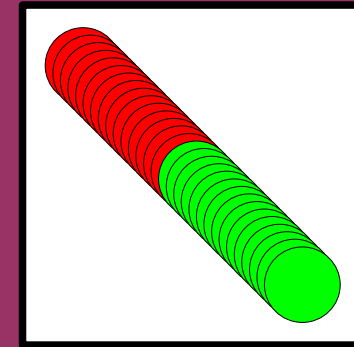
...



# What are Perceptions: "Colour Phi"



"Outside"



Perception

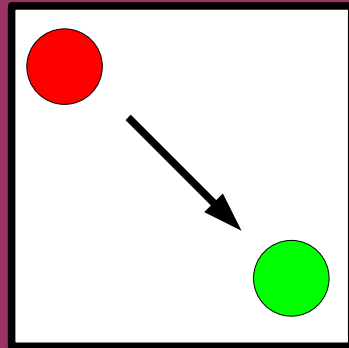
Brain tells a story!

*What did I perceive?*

*Two single dots?*

*Moving dot a fiction as the "self"?*

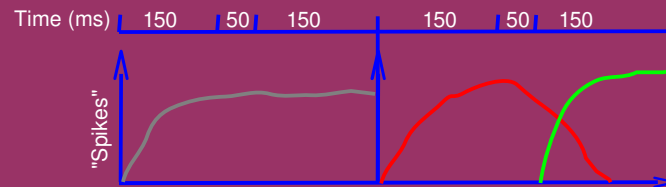
# What are Perceptions: "Colour Phi"



150 | 50 | 150



"Outside"



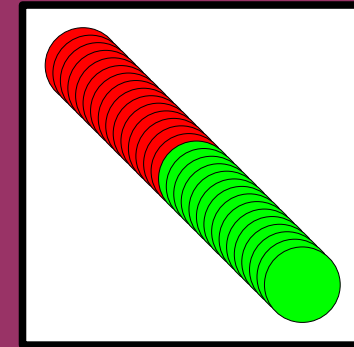
"Circle"



"red"



"green"



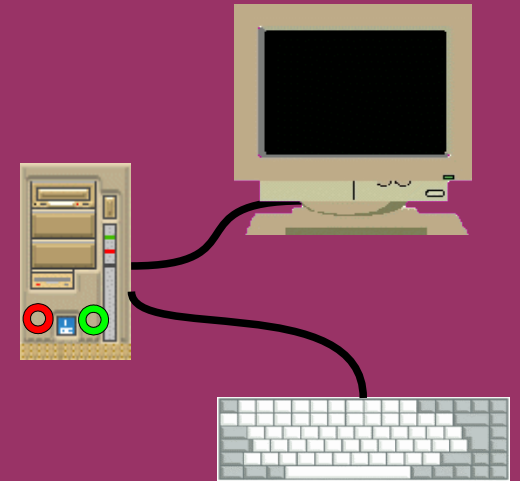
Brain tells a story?

Neuronal descriptions provide transparency  
Close to perception of "really" moving dot  
All our perceptions a "simple story" told by the brain?  
*Moving dot a fiction as the "outside world"?*

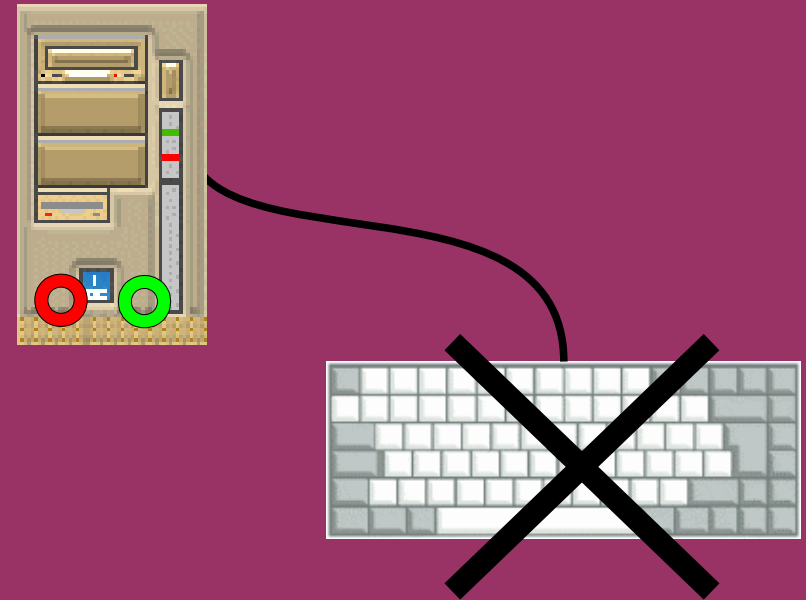
"Outside world"  $\neq$  Perceptions!  
Brain is our Interface to the World

# A more *complete* Computer-Analogy

Observe computer

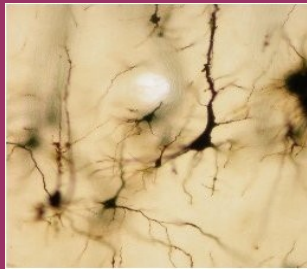


Autonomous actors: brain and computer



No external "metaphysical" programmer

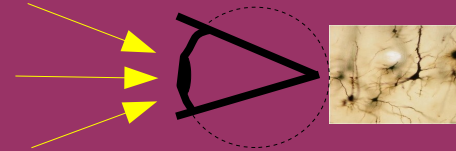
# A more *complete* Computer-Analogy



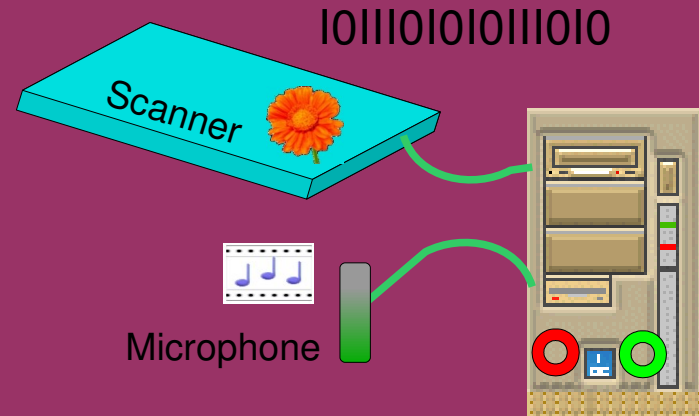
Neuronal Codes



Binary Codes

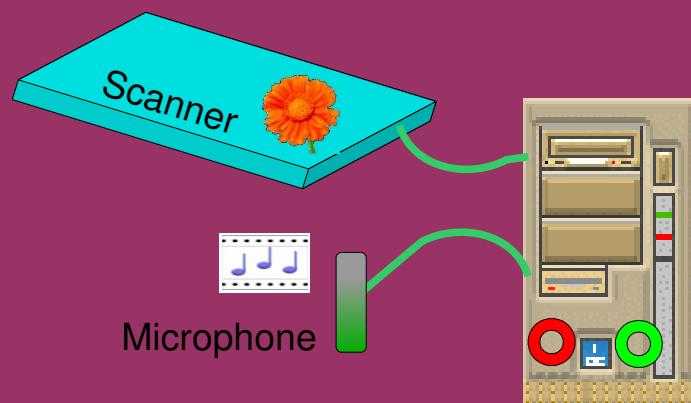
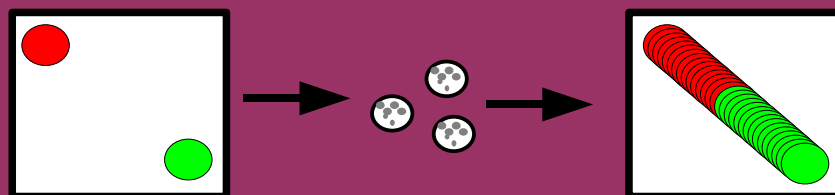


## 1. Operational Codes



## 2. Environment

# A more *complete* Computer-Analogy



## Observations

We see this dot as we see a really moving dot

But it is definitely not on the scanner

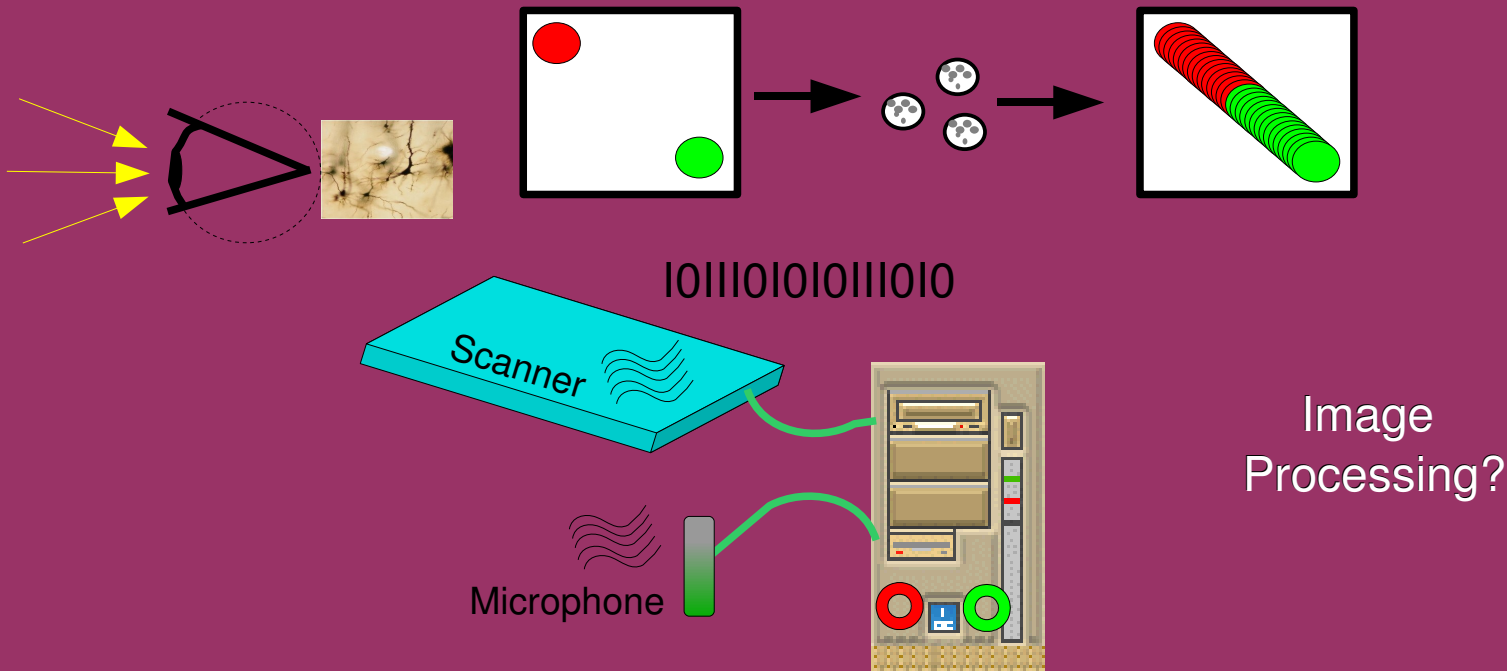
What does it mean to *see*?

Where is our "outside world"?

Just in the head?

Natural laws?

# A more *complete* Computer-Analogy

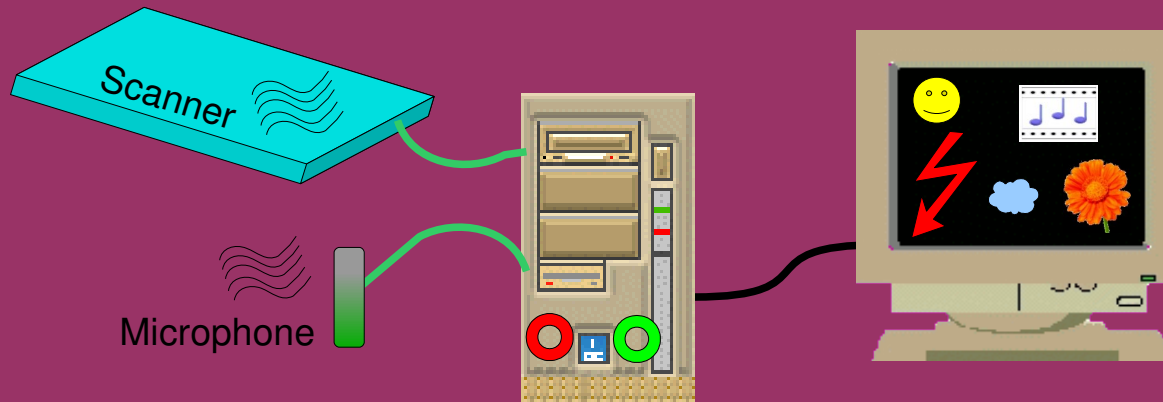
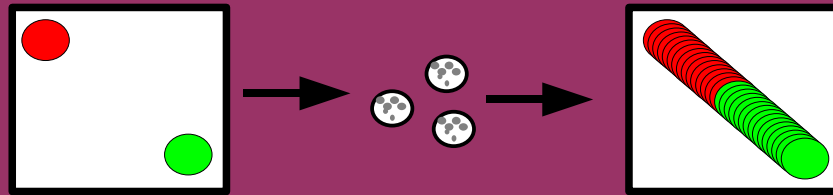


## Observations

- Neurons do "image processing"
- Processing input to determine the output.
- Neurons spike and determine my behaviour.
- Neurons do not see, hear, or feel etc.

Would our computers – so far - be able to communicate about "phenomenal qualities"?

# A more *complete* Computer-Analogy



## Observations

Neurons do not *experience* – they spike

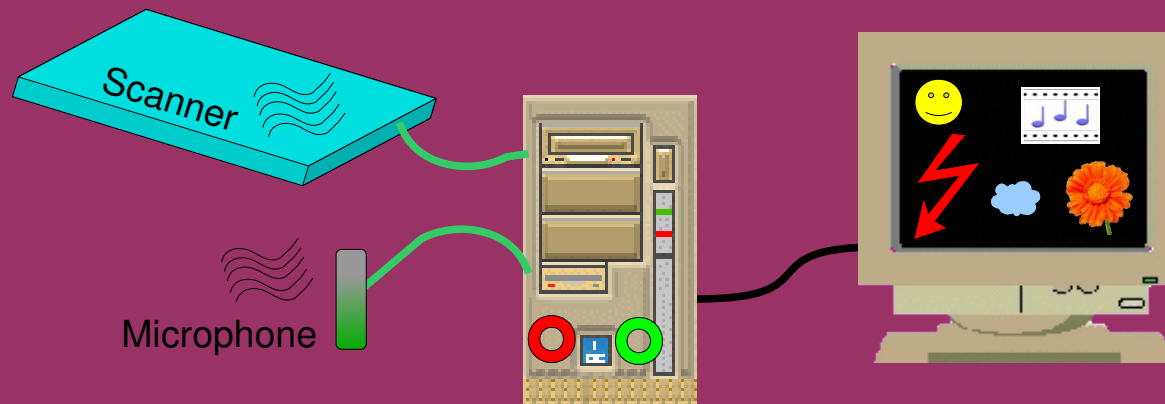
**We** seem to experience "outside world" and "inner" feelings

Experience dependent on neurons

Experience itself of no causal relevance for neural operation

# A more *complete* Computer-Analogy

## 3. Phenomenal Experience



Perception of single moving dot

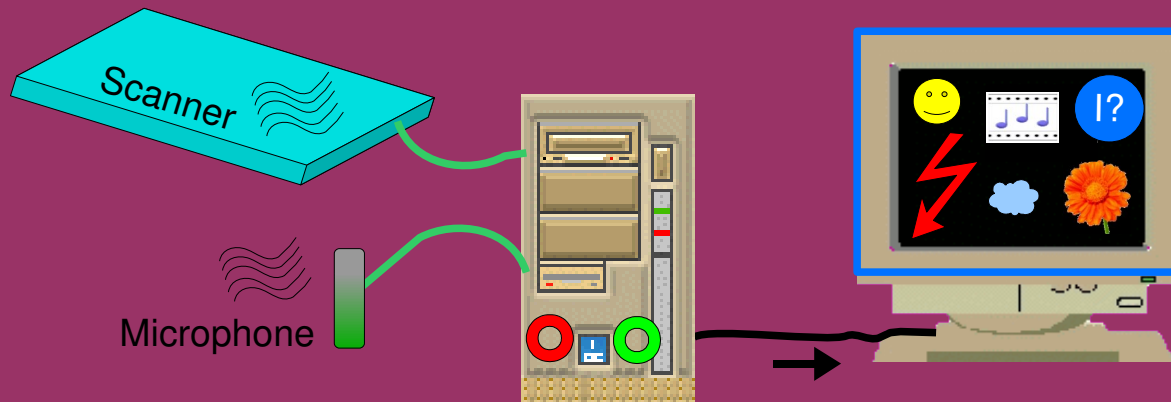
Presentations different but dependent on operational code

Presentations unnecessary for an autonomous actor computer



# A Phenomenal Screen

Self?



1. Person Perspective

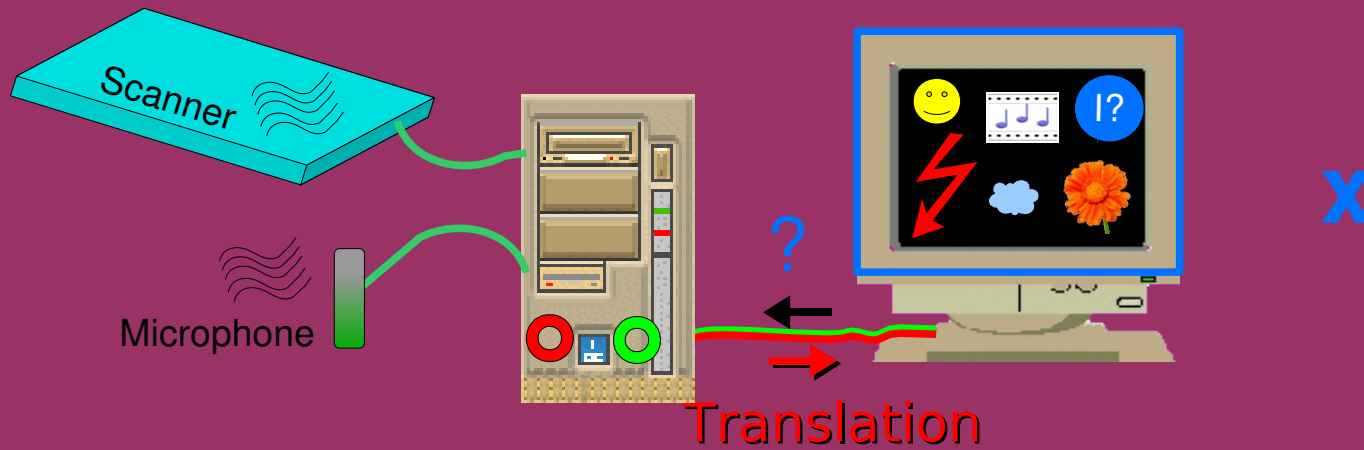
Biological process

Physical properties

Neurons do more than necessary  
Responsible for phenomenal experience

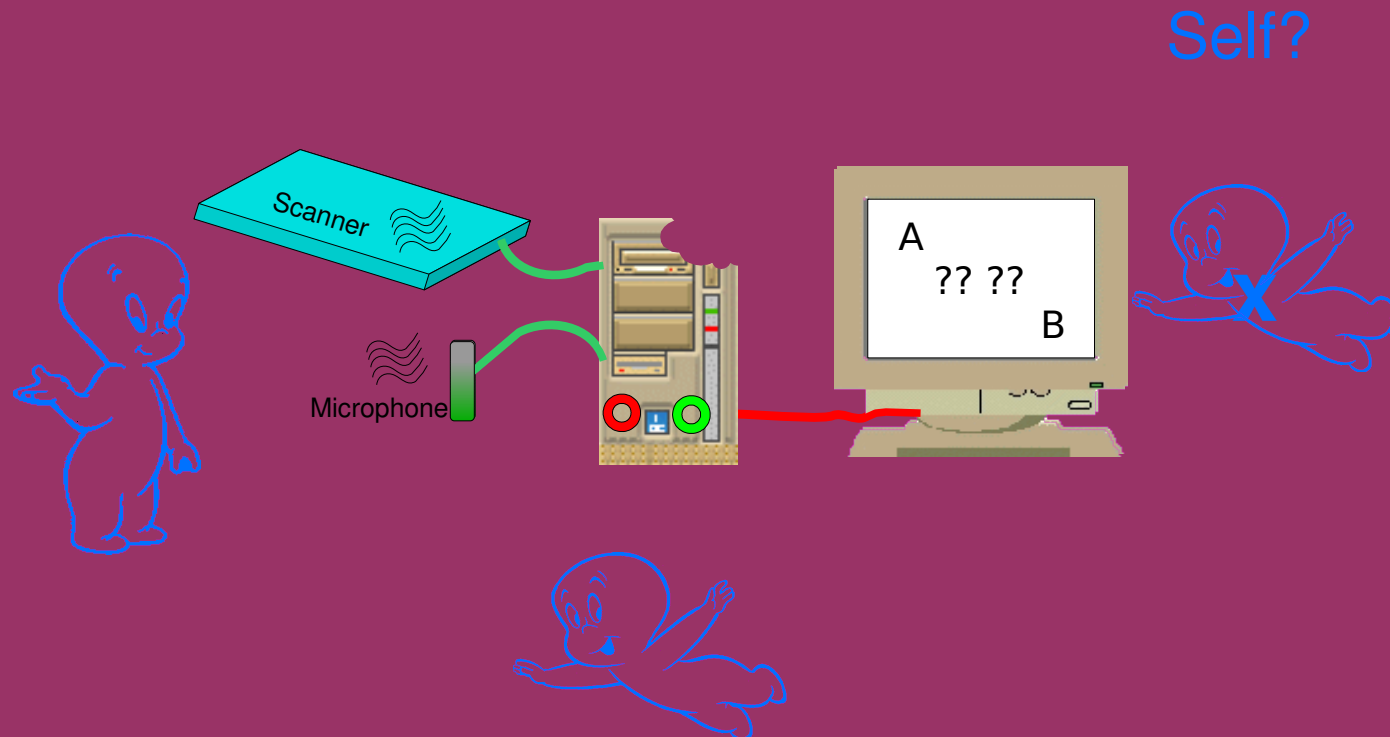
# A Phenomenal Screen

Self?



# No "higher-order" self?

## Anosognosia/Neglect



Access to the "outside world" only via the neurons!

# Benjamin Libet: Free Will ...

Readiness potential

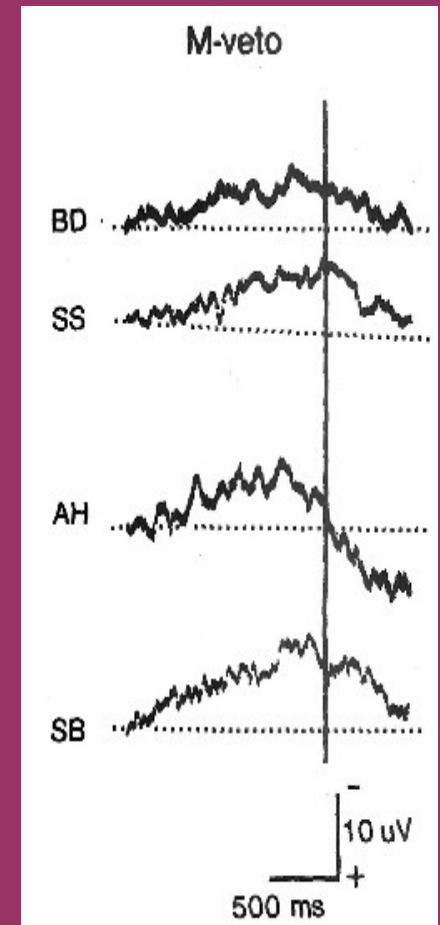
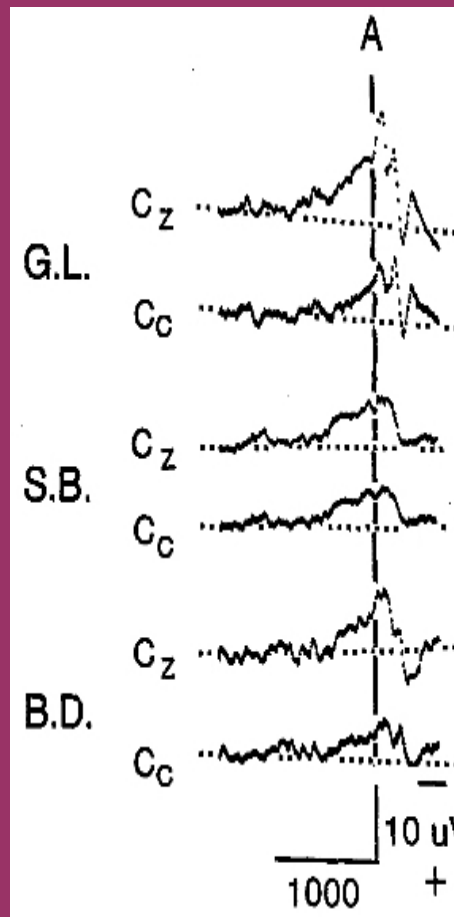
Neither necessary nor sufficient for an actual movement

What is it?

*Why* increased activity?

Readiness Potential represents "attention"?

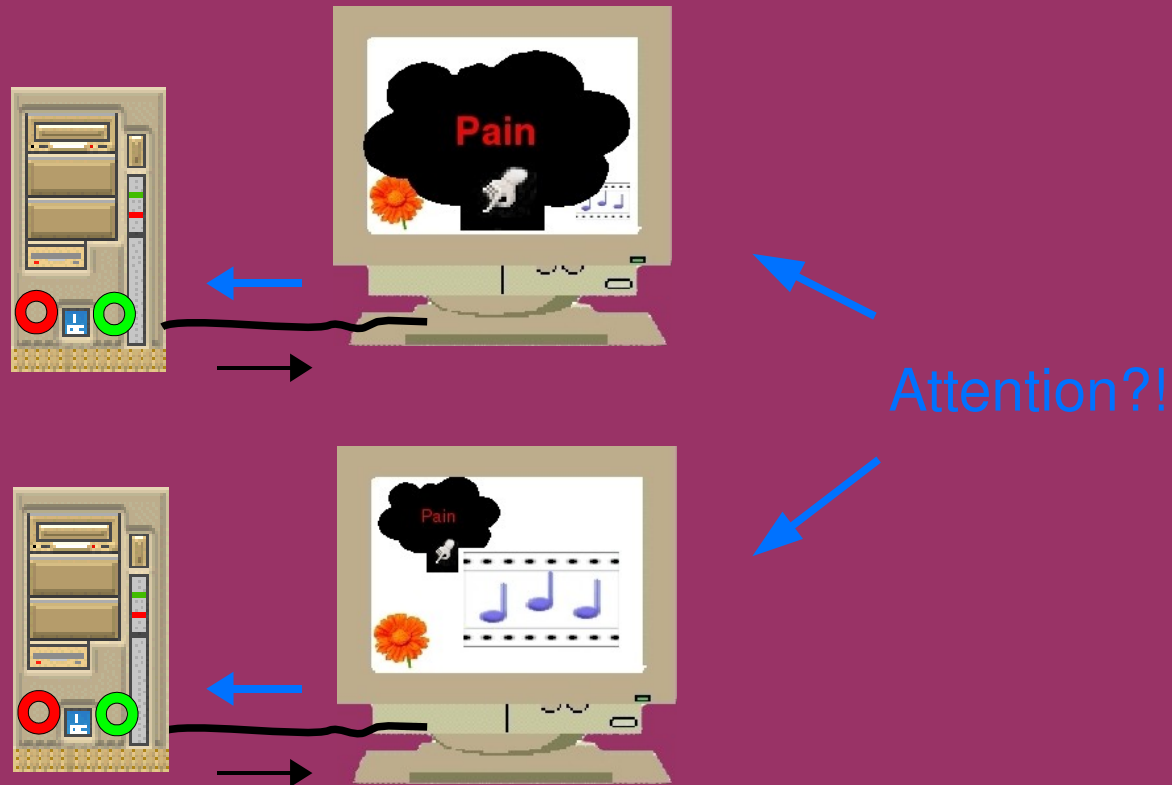
Attention ?



# Daniel Wegners ironical processes

Intention: *Not* to think on something... Result: ...

Meanings?!

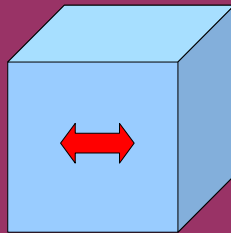
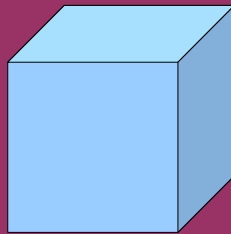




"Self"

Perceptions

Sensations

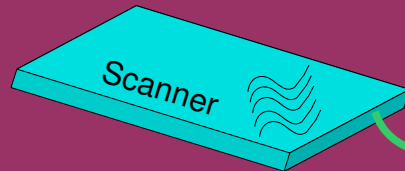
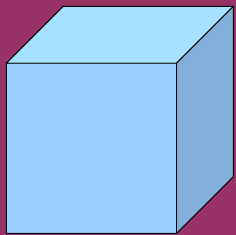




"Self"

Perceptions

Sensations



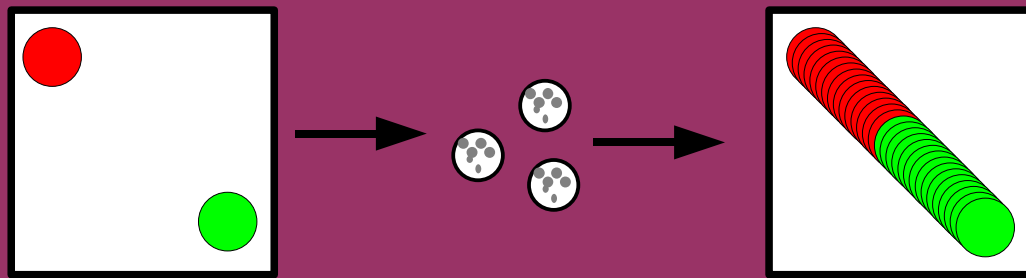
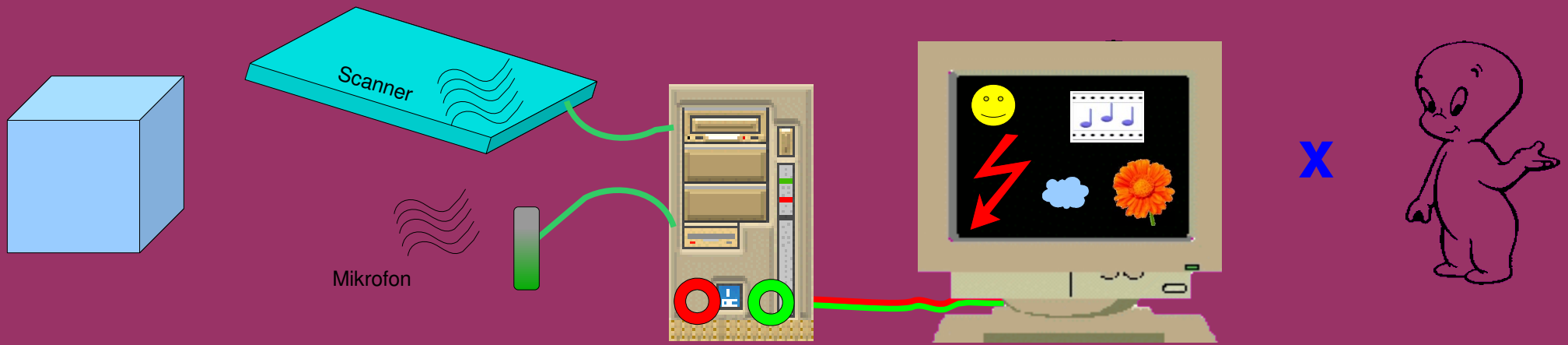
*Perspectives*

*Computers and Brains*

*Minds and Machines*

Thank you very much  
for your  
**Attention**





# Causal Closure?

