

Consciousness

Consciousness

- Describe *consciousness* in two sentences.
- We could ask ‘how does the brain *make* consciousness?’ (we don’t know that it does)
- ..or ‘how does consciousness *arise* in the brain?’ (we don’t know that it does)
- ..or we could hold off, and ask what this *consciousness* word refers to in the first place

Some discussion around this topic makes it sound as if the brain were an organ that secreted consciousness, much as the liver secretes bile.

That should give you pause for thought.

Is that what you would like from a story about consciousness?

Caution: people tend to mean
very different things when talking
about consciousness

Two of many meanings:

Access Consciousness

Phenomenal Consciousness

Information available,
or potentially available,
for report

Present Experience

Here/Now.....I?

There are other uses of this word too...

Topic I:

Access Consciousness

Access Consciousness



Tip-of-the-tongue states illustrate access consciousness

When people distinguish between an “Unconscious” or “Subconscious” and a domain of the “Conscious”, they are using the notion of “Access Consciousness”



Sigmund Freud’s Psychanalytic theory of the unconscious is *not* part of the scientific mainstream.

Nevertheless, it has been very influential.

Roughly speaking, *Access Consciousness* refers to the set of things you can provide verbal report on.

The underlying assumption is that you can report on things that form part of your experience.

(Side note: like pretty much every word associated with consciousness studies, I see “access consciousness” can also refer to a new-age cult offering enlightenment for free. Beware.)

One Scientific Theory of Access
Consciousness:

Global Workspace Theory

In the Theater of Consciousness

Selective attention
controls the
spotlight that selects
what will be in the
bright spot on stage

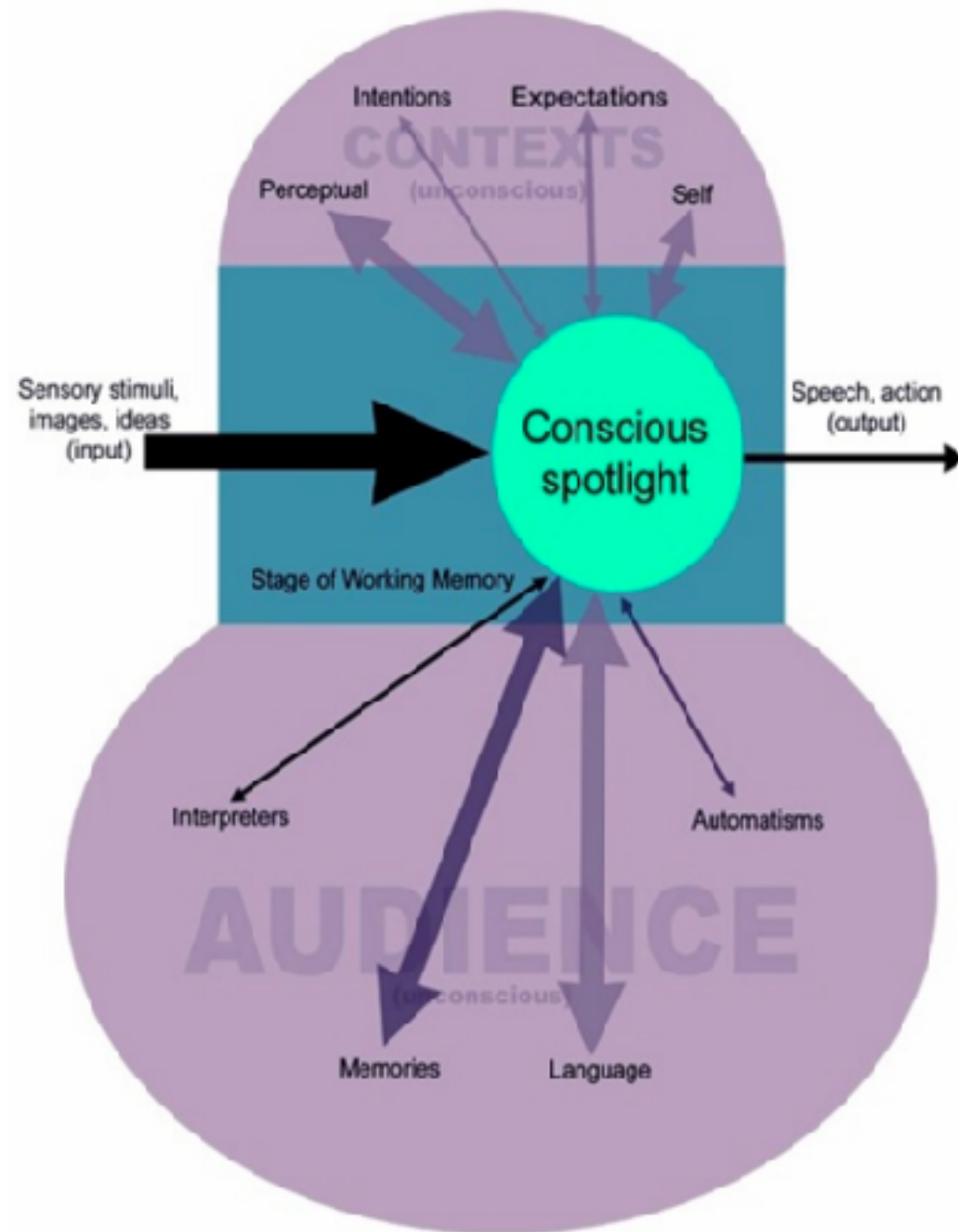


The bright spot on stage has limited capacity.

The audience has vast capacity.

The audience is unconscious

In the Theater of Consciousness – a useful theoretical metaphor



--- only the bright spot on stage is conscious (because consciousness is very limited in capacity)

--- sensory inputs compete for access to the conscious bright spot; so do output plans;

--- the "theater stage" corresponds to Working Memory;

--- all other parts are unconscious, including longterm memory, the automatic processes of language, and events going on backstage. (The capacity of unconsciousness is enormous.)

-- the theater metaphor has been turned into several testable models.

Global Workspace Theory

Lots of processing is unconscious, e.g. early stages of word recognition

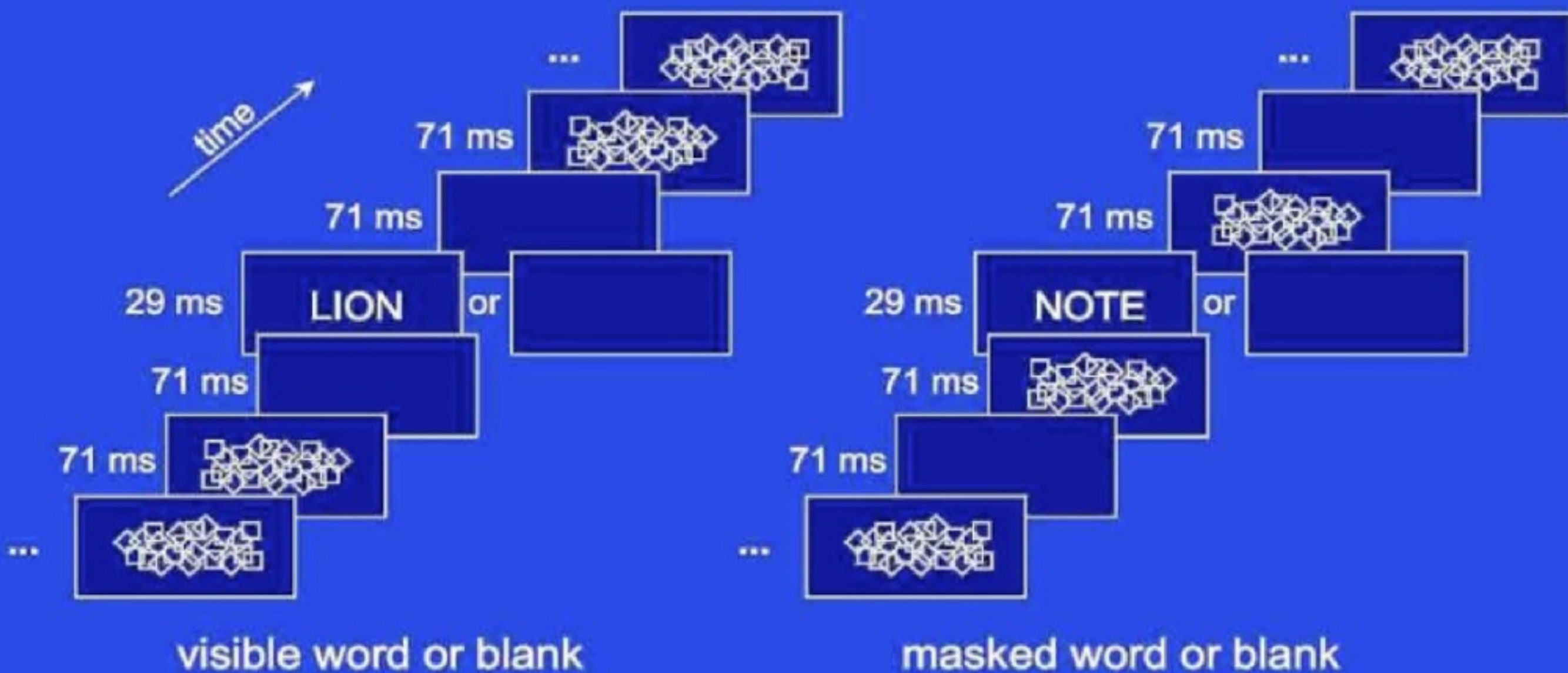
Some products of unconscious processing become globally available (think of these that are in the spotlight)

This shows up as massively distributed activation over wide areas of the brain.

Dehaene et al (2001):

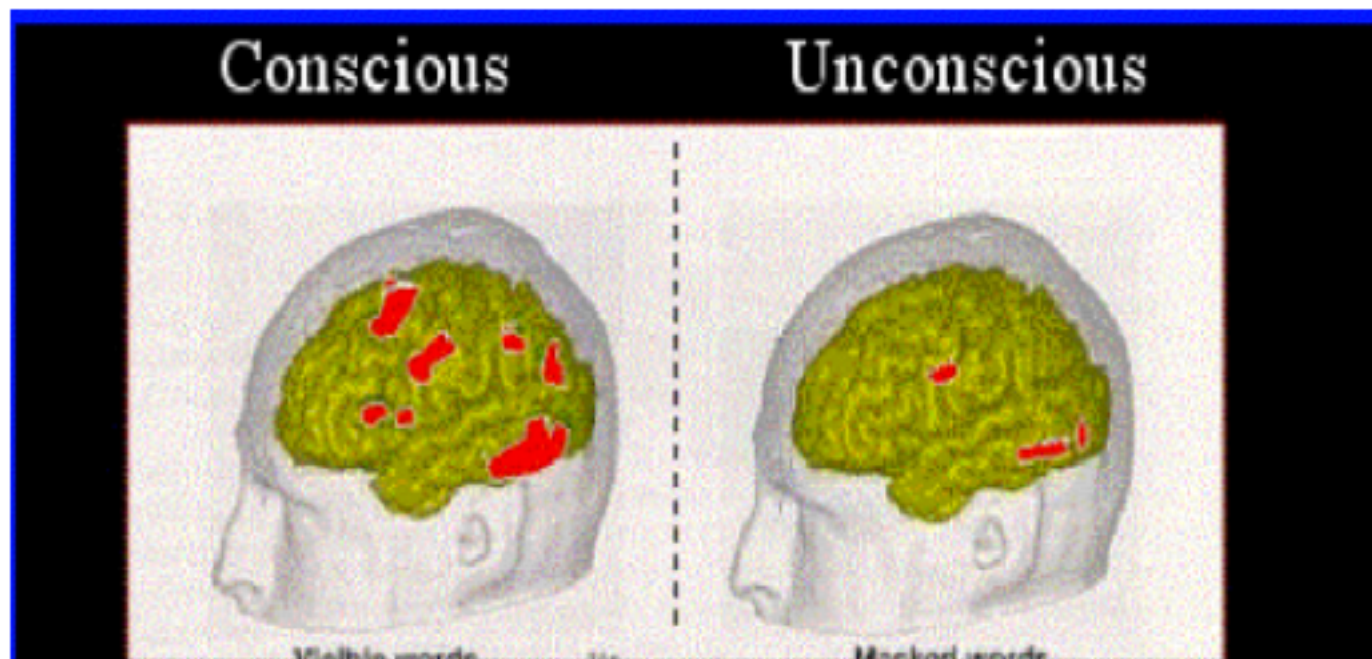
Presented words that were either masked (i.e. very brief presentation followed by a distracting stimulus) or clearly visible.

Brain Mechanisms of Conscious and Unconscious Reading



Dehaene et al (2001):

Presented words that were either masked (i.e. very brief presentation followed by a distracting stimulus) or clearly visible.

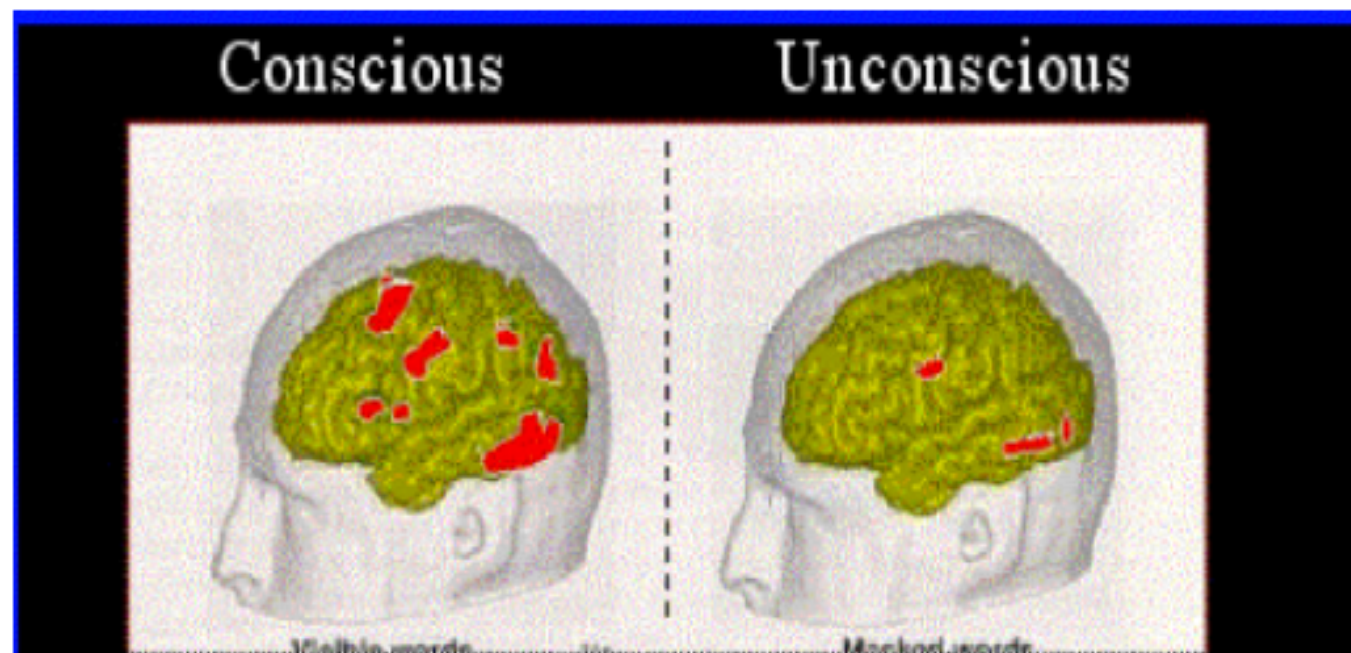


Masked words (not consciously seen) activated regions known to be involved in word recognition



Dehaene et al (2001):

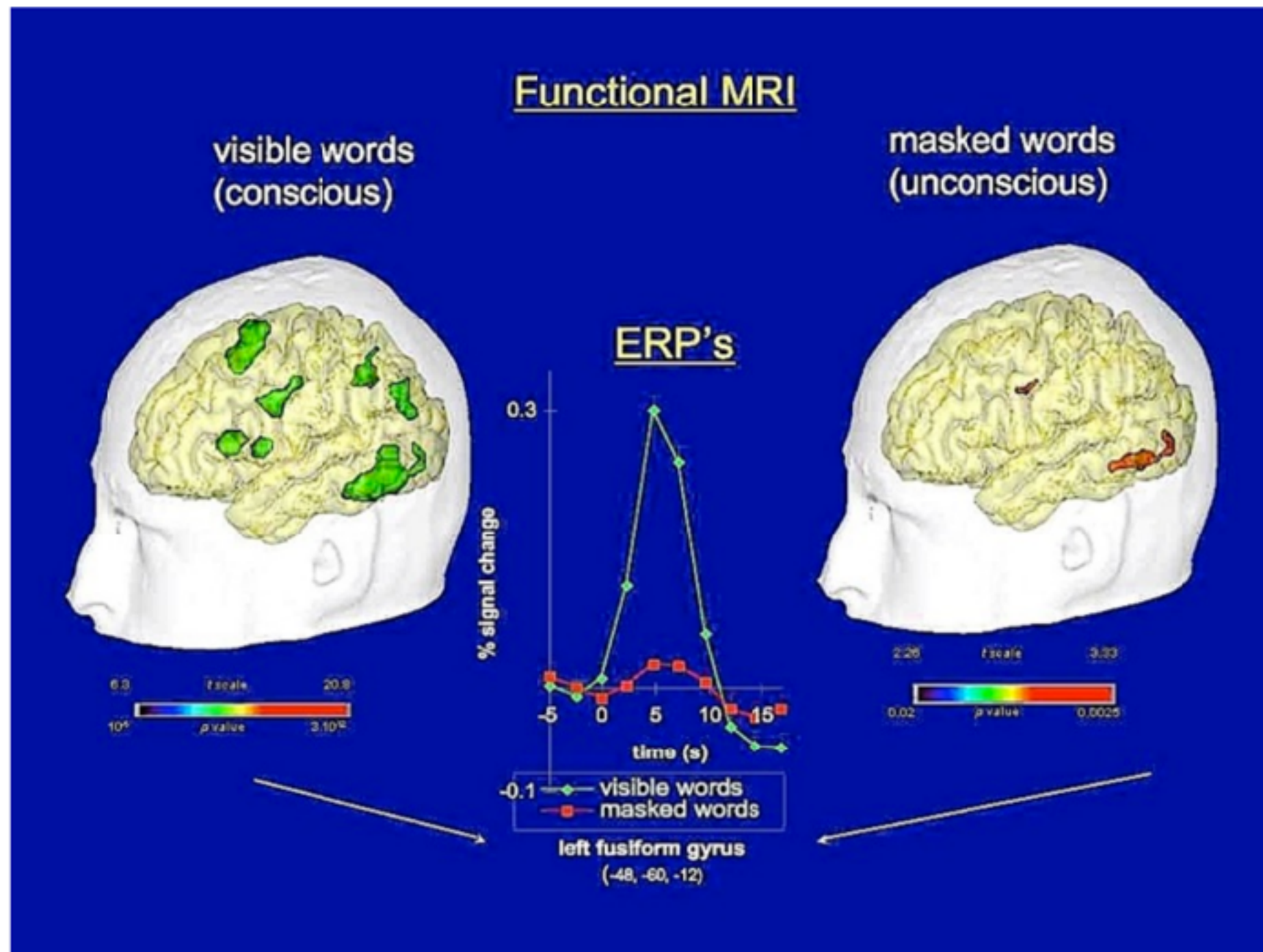
Presented words that were either masked (i.e. very brief presentation followed by a distracting stimulus) or clearly visible.



Words that were clearly seen (consciously) activated much wider networks distributed throughout the brain

Results are “consistent with Global Workspace Theory”

Experimental results:



ERP = Event
Related
Potential:
obtained
through EEG
measurement
(not fMRI)

From Dehaene et al, 2001

The Global Workspace Theory lies squarely within those *cognitivist* approaches that understand *mind* to be best described as information processing.

Food for thought: what kinds of facts about a person and their behavior can this kind of approach potentially deal with?

Are there aspects to the person they can not deal with?

One assumption of Global Workspace Theory is that minds are singular (you have one, I have one) and discrete (yours is independent of mine).

It is thus incompatible with some other frameworks:

- * Extended mind (possibility of overlap, inclusion of the material world)
- * Distributed cognition (cognition not attributed to individual minds, but seen as a collective accomplishment)

Subliminal Advertising



In 1957, James Vicary held a news conference to announce that he had developed a powerful new way to influence consumers: subliminal projection.

Messages were flashed very briefly on a cinema screen” “Hungry? Eat Popcorn!”, “Drink Coca Cola”, etc.

He claimed amazing effectiveness, and the mainstream media bought into such claims in droves

The results were not obtained using scientific methods, and were not published in scientific journals.

In 1962, he admitted the whole thing was a gimmick.

But the popular belief in the power of hidden messages lives on, despite everything

This kind of nonsense is still ubiquitous!

Lose weight
Seduce others
Get rich quick
Be effective and successful



Brainwashing
Satanic messages in rock music
“Neuro Linguistic Programming”

*NLP is not neuroscience, not linguistics, and not programming



SUBLIMINAL MESSAGES

It's A LITTLE OBVIOUS HERE BARACK

Subliminal advertising, in the strict sense, was something of a hoax.

This does not mean that we are unaffected by our environments, and that much (most?) of this influence is not noticed by us.

Behavioural shaping (remember that?) is used throughout the commercial world.

Qualia and the so-called “Hard Question” of Consciousness



David Chalmers has tried to untangle some of this, by distinguishing between the *easy* problems of consciousness, and the *hard* question of consciousness

(his Scientific American article is **required reading** for this week!!!)

Easy Question 1: Why do we have access consciousness to some information and not to other

According to Chalmers, issues of *access consciousness* belong to the set of *easy* questions about consciousness

NOT because the questions are really easy, but because we can imagine how we might some day have a scientific account of them, using the kind of science we have now

Another “easy” issue in studying consciousness:
How does brain activity differ as we move through
states of sleep, waking, hypnosis, coma, drugs, madness,
etc



One very useful sense of the word “Consciousness” is to draw distinctions between our state when awake, asleep, in a coma, in psychosis, on drugs, under hypnosis, etc etc.

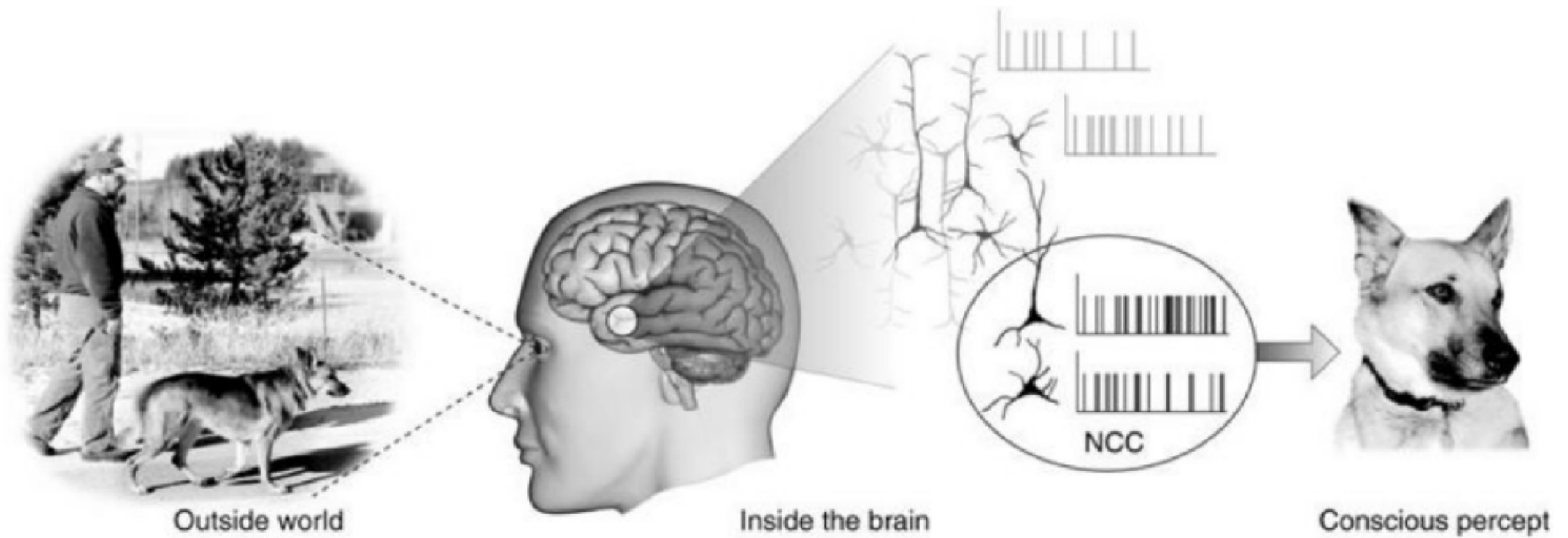
This is only one sense of the word, but it is a useful one.

Don't assume when the word “consciousness” is used that it is always used in this sense.

Easy Question 2: What are the Neural Correlates of Consciousness?

Why might it be important to recognize brain signatures of different states of consciousness?

These are known as the *Neural Correlates of Consciousness*.



Neural Correlates of Consciousness, e.g. Christoph Koch

Another potentially “easy” problem of consciousness:

E.g. we know that some visual information is processed in the dorsal (‘where’) stream, and some in the ventral (‘what’) stream. But we are not aware of any separation of information. How come we are unaware of this apparent separation? (This is known as the binding problem).

We don’t (yet) know the full answer to this, but we can imagine finding an adequate answer (e.g. synchronization among distinct brain areas)

Phenomenal Consciousness

The hard question: Why does anything *feel like* anything at all?

How do we incorporate *subjective experience* into a scientific picture?

Our language around this question is unreliable and prone to causing misunderstanding

Qualia

Redness: what it feels like to see red

Pain: what it feels like to feel pain

Those aspects of experience which are inherently subjective

Qualia seem to play no causal role in any explanation of brains and behaviour we have provided so far

Ineffable, intrinsic, private, directly presented to consciousness

Zombies



Zombies?

Could there be a 'person' who was physically indistinguishable from any of us, but entirely lacking in this subjective world of qualia?

Would they be conscious? Or would they be Zombies?

What role does this subjective world of raw feeling play?

Thought experiment to help you think about qualia:

Mary is a neuroscientist who knows pretty much everything there is to know about colour. But Mary has been kept in a black and white environment all her life.



Q: What do you know about colour that Mary does not????

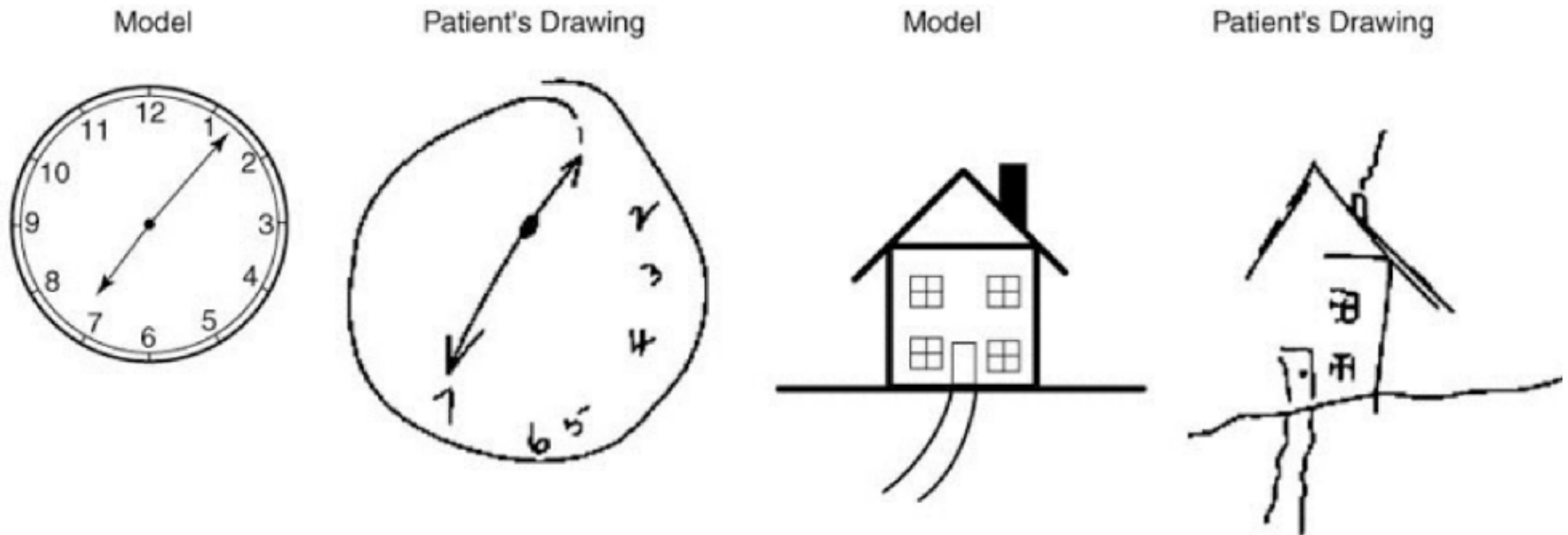
The Vocabulary of Consciousness Studies includes a lot of overlapping concepts

- Phenomenal Consciousness
- Awareness
- Attention

3 overlapping concepts, difficult to keep apart

Attention: unilateral neglect

After unilateral brain damage (typically a stroke) some patients display *unilateral neglect*, in which half of the visual field is ignored.



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Unilateral Neglect

Follows damage to one side of the brain

Visual processing is unimpaired, but the patient cannot *attend* to one side of their visual field

They may apply makeup to one side of the face only

..or ignore food on one side of their plate.

Controlled Versus Automatic Processes

- *Controlled* processes
 - Require intentional effort; full conscious awareness; consume many attentional resources; performed serially; relatively slow
- *Automatic* Processes
 - Little or no intention or effort; occur outside of conscious awareness; do not require a lot of attention, performed by parallel processing; fast

Controlled Versus Automatic Processes

- Many tasks that start off as controlled processes eventually become automatic ones
- Automatization
 - The process by which a procedure changes from being highly conscious to being relatively automatic

Differences between automatic and controlled processes

Read through this list of color names as quickly as possible. Read from right to left across each line

Red	Yellow	Blue	Green
Blue	Red	Green	Yellow
Yellow	Green	Red	Blue

Differences between automatic and controlled processes

Name as quickly as possible the color of ink in which each word is printed. Name from left to right across each line.

Red	Blue	Green	Yellow
Yellow	Red	Blue	Green
Blue	Yellow	Green	Red

This is known as the 'Stroop effect'.

You are now in a position to distinguish between
(at least):

Access consciousness

Phenomenal consciousness

States of consciousness

Neural correlates of consciousness

The “hard” question of consciousness

We did not do justice to the important notion that *consciousness* has something to do with self-awareness (of what by whom?).

This is an important and rich way of thinking about subjectivity, mind, and being, but it leads us too far astray for now.

I recommend continuing to wonder about this for the rest of your life. Many others have, and have found it enriching.

(And yes, there is some math and some science that is relevant, but also some music, poetry, and more...)

Who studies consciousness?



Cognitive
Scientists/
Neuroscientists

Psychologists

Philosophers
(phenomenology)

Psychiatrists



Psychoanalysts



Contemplative traditions

Poets?

Physicists????

If science restricts itself to *objective* accounts of observable entities, can there ever be a science of consciousness?

Is consciousness inherently subjective?

Important note: If you think the distinction between *objective* and *subjective* is clear and simple, then you haven't yet looked into the issue. Objectivity and Subjectivity are rich, complex, and multi-faceted.

If we rule the subjective out of bounds, do we thereby abandon all hope of ever having a science that can address

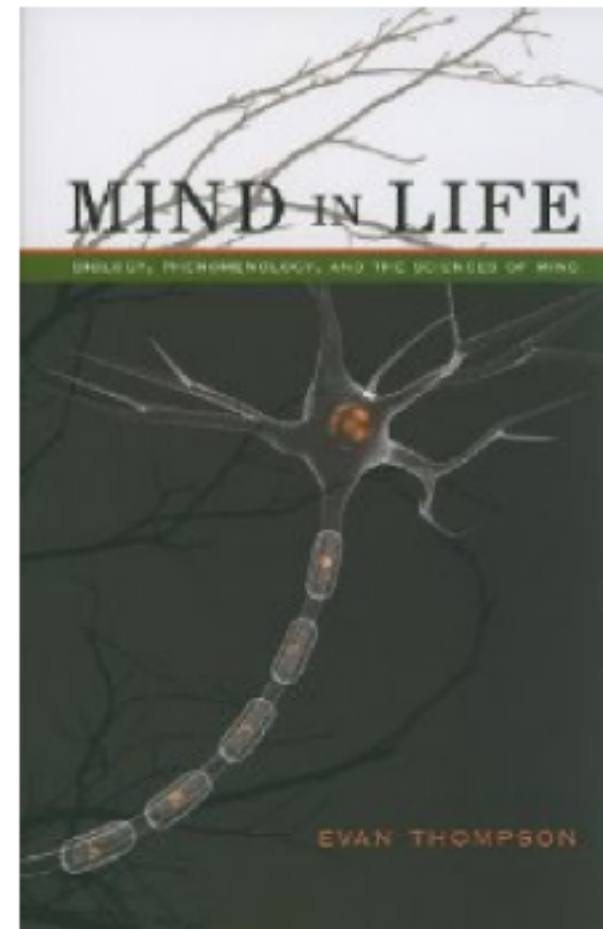
- * suffering?
- * meaning?
- * value?
- * feelings?

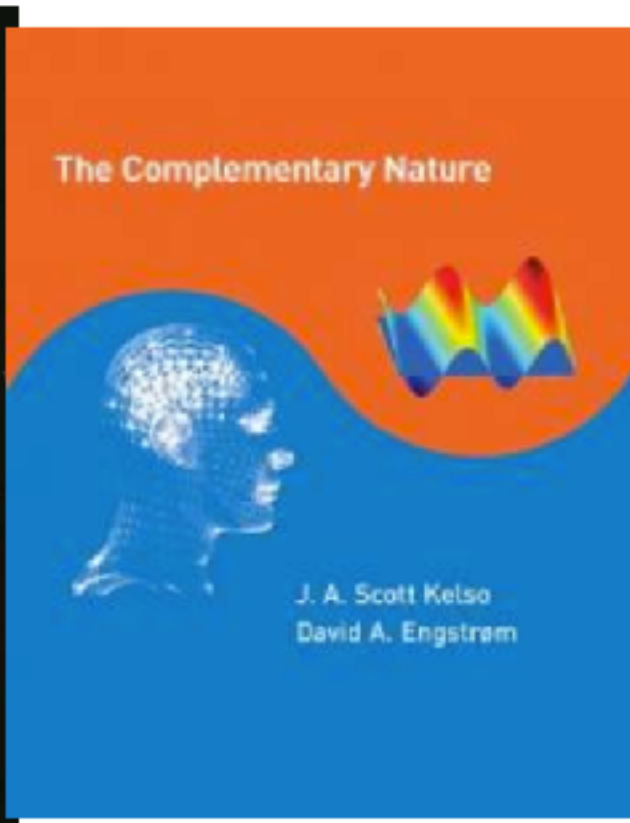
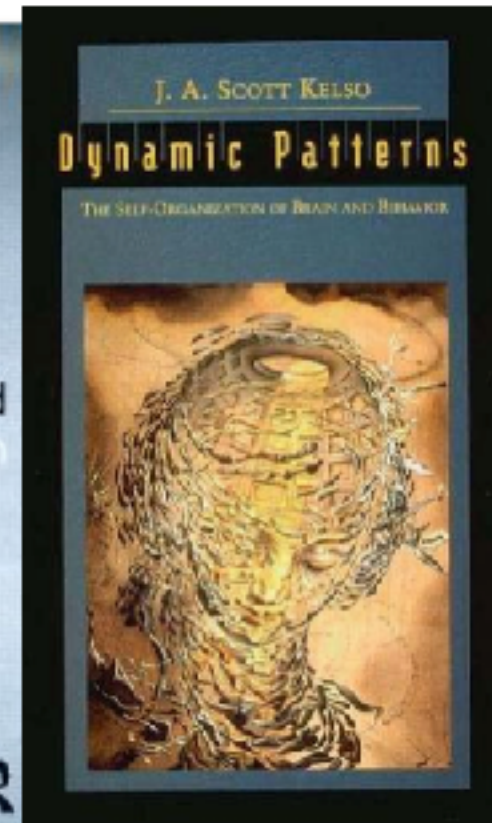
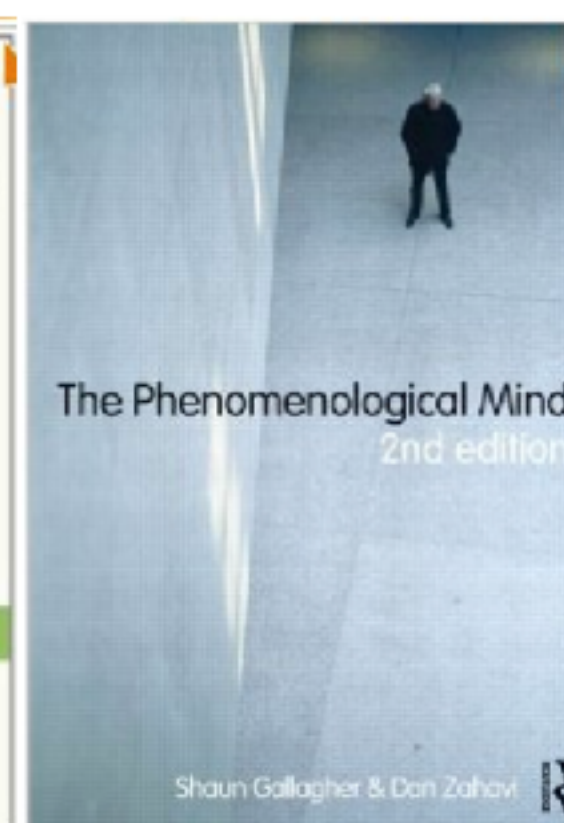
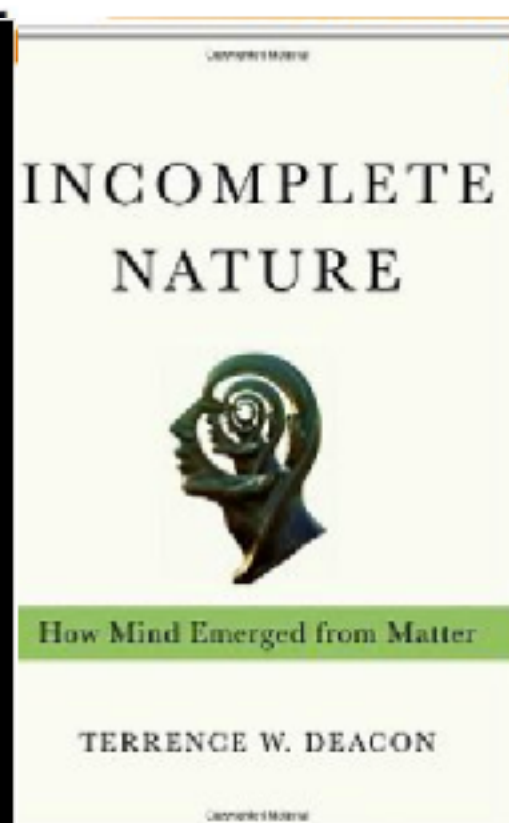
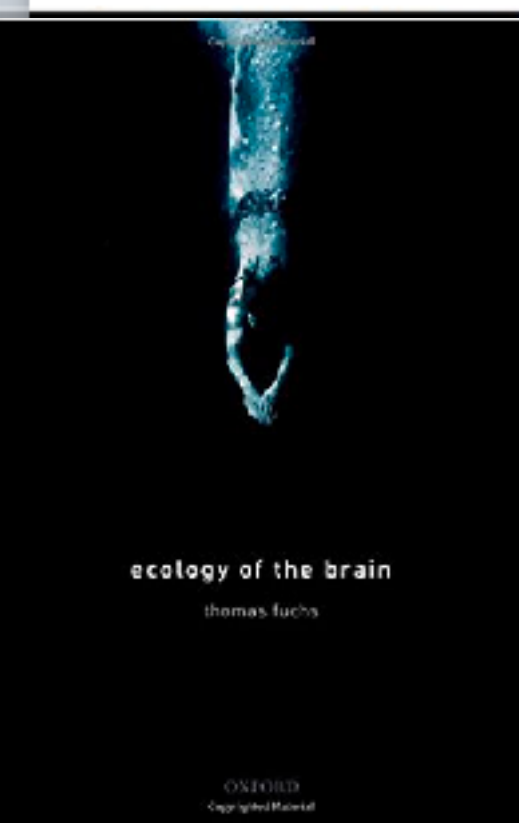
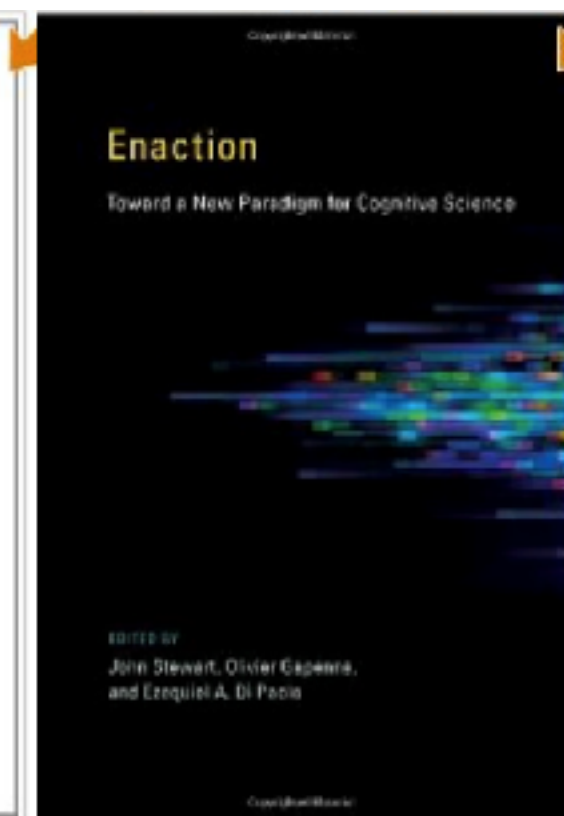
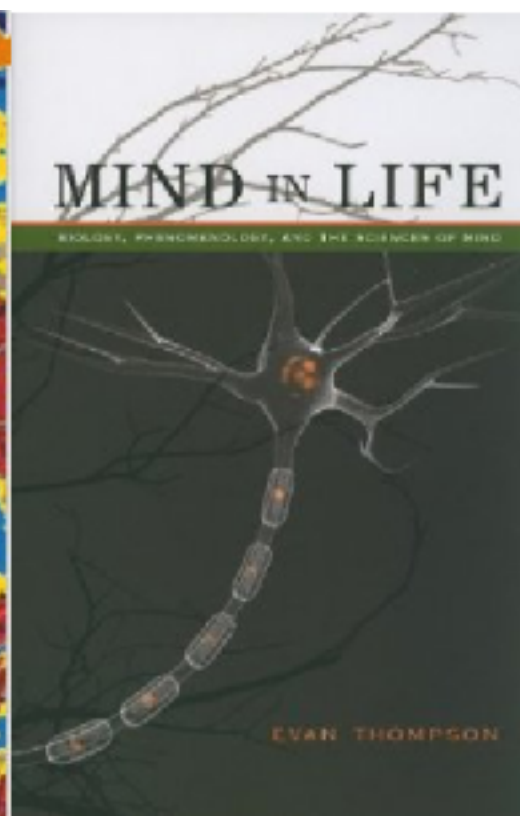
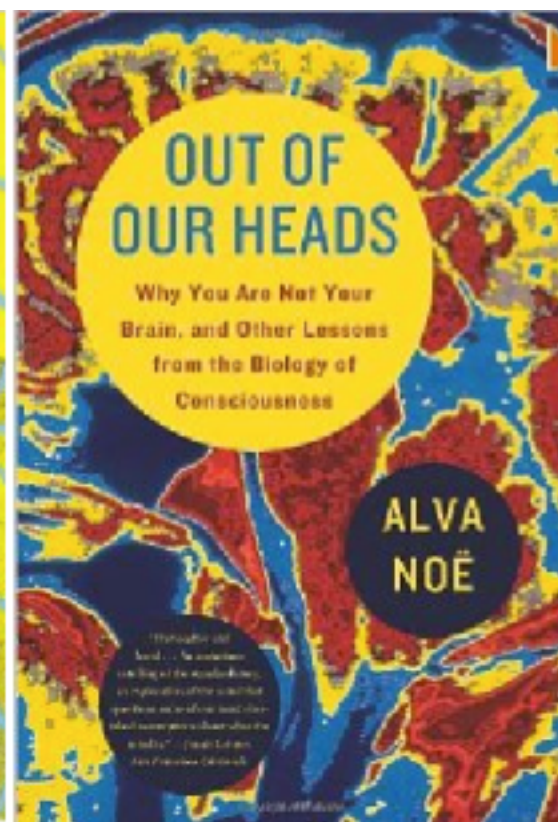
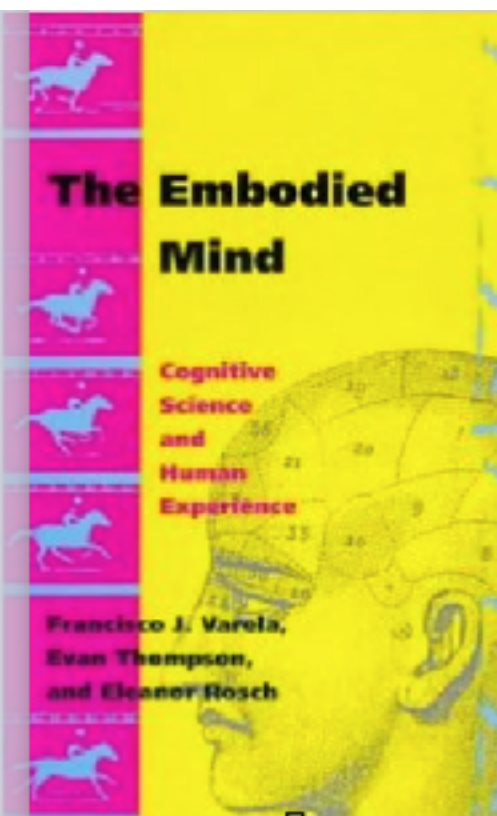
This should appear as something of a (worthwhile) challenge.

One major up-and-coming approach within Cognitive Science sees mind -- NOT as a product of brains, BUT as co-extensive with life itself.



MIND & LIFE
INSTITUTE





Subject~Object



Subjective~Objective

Mental~Physical

Mind~{body/brain}





The scientific treatment of consciousness is not “just another topic”. Dealing with this might fundamentally alter our understanding of our selves and the cosmos. Things are just taking off . . .

Some lessons learned?

Many of the words we use to speak of our person, our experience, our selves, are poorly defined.

The include such words as:

- * Mind
- * Thought
- * Consciousness
- * Perception
- * Attention
- * Memory

In any given context, as we discuss things with specific people, we will rely on certain framing assumptions.

If you have learned one thing from this course, let it be this:

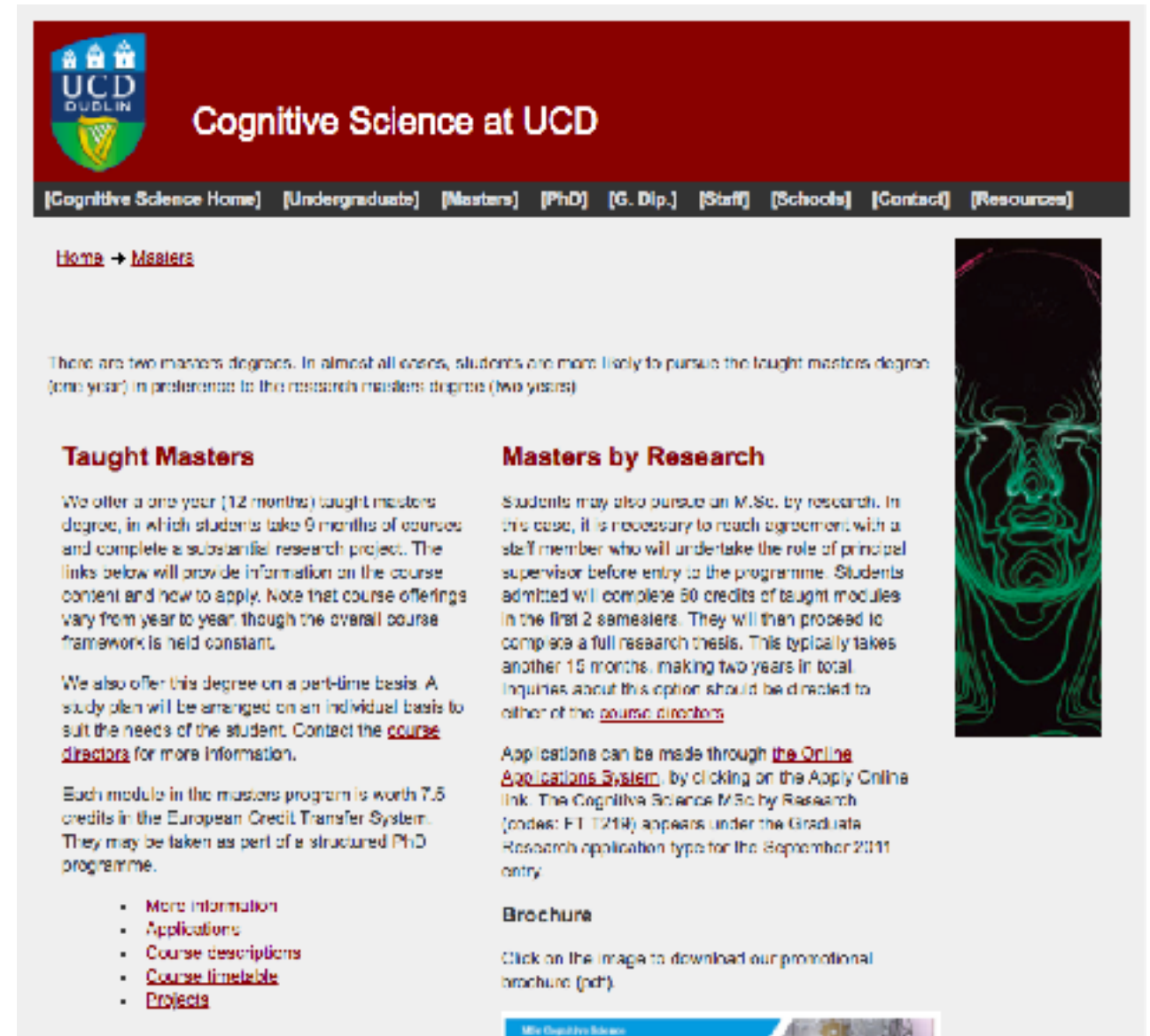
We can become aware of those framing assumptions

If we are aware of those framing assumptions, there is less likelihood of misunderstanding

Others may not share our framing assumptions. Be on the lookout for this!

<http://cogsci.ucd.ie/masters.php>

- * 12 month taught masters
- * Ideal preparation for continued research (PhD or similar)
- * Not a psychology degree, not a step towards a caring profession
- * Well suited to those who can mix their science and philosophy



The screenshot shows the 'Cognitive Science at UCD' website. At the top is the UCD Dublin logo and a navigation bar with links: [Cognitive Science Home], [Undergraduate], [Masters], [PhD], [G. Dip.], [Staff], [Schools], [Contact], and [Resources]. Below the navigation bar is a link 'Home → Masters'. The main content area is divided into two columns. The left column is titled 'Taught Masters' and contains text about a one-year (12 months) taught masters degree, where students take 9 months of courses and complete a substantial research project. It also mentions a part-time option. The right column is titled 'Masters by Research' and describes an M.Sc. by research, requiring agreement with a staff member, completion of 60 credits of taught modules in the first 2 semesters, and a full research thesis. A vertical image of a stylized face is on the right side of the page. At the bottom, there is a 'Brochure' section with a link to download a promotional brochure (pdf).

UCD DUBLIN

Cognitive Science at UCD

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[Home](#) → [Masters](#)

There are two masters degrees. In almost all cases, students are more likely to pursue the taught masters degree (one year) in preference to the research masters degree (two years).

Taught Masters

We offer a one year (12 months) taught masters degree, in which students take 9 months of courses and complete a substantial research project. The links below will provide information on the course content and how to apply. Note that course offerings vary from year to year, though the overall course framework is held constant.

We also offer this degree on a part-time basis. A study plan will be arranged on an individual basis to suit the needs of the student. Contact the [course directors](#) for more information.

Each module in the masters program is worth 7.5 credits in the European Credit Transfer System. They may be taken as part of a structured PhD programme.

- [More information](#)
- [Applications](#)
- [Course descriptions](#)
- [Course timetable](#)
- [Projects](#)

Masters by Research

Students may also pursue an M.Sc. by research. In this case, it is necessary to reach agreement with a staff member who will undertake the role of principal supervisor before entry to the programme. Students admitted will complete 60 credits of taught modules in the first 2 semesters. They will then proceed to complete a full research thesis. This typically takes another 15 months, making two years in total. Inquiries about this option should be directed to either of the [course directors](#).

Applications can be made through the [Online Applications System](#), by clicking on the Apply Online link. The Cognitive Science MSc by Research (code: FT 1214) appears under the Graduate Research application type for the September 2011 entry.

Brochure

Click on the image to download our promotional brochure (pdf).

More Cognitive Science

Spare a thought for the alchemist!



